

MONTHLY

MECHANICS - AUTOS - HOMEBUILDING

New Way
To Set
Ceramic Tile PAGE 1

The ABC'S of Color Television

PAGE B

N3785E

He Rides a Kite

PAGE 9

AMAZING BARGAINS FOR



Costly, Precision-Ground Lenses for Super Viewing

The POWERHOUSE LENSES are the crowning achievement of this 99year old German firm each and every lone is ground a patished to a high tolerance, then carefully checked for accuracy! NOV mounded plastic type stamped out by the mailton. No excessive distortion or "ghosts" found in cheap glasses. Were you to spend \$25, we possible type potter lenses! Send coupon TODAY and get your POWERMOUSE I plus your FREE Specto-Scopes; at this low introductory price of 4.92, ian paid, including handsome LEATHER case: Sorry, but heated import supply forces us to restrict orders to OME binocular per repoter.

No. 8 . . . FOWERHOUSE BINGCULARS & LEATHER CASE 4.98 tex sold THORESEN'S, Dept. 7-G, 352 Fourth Ave., New York 10, N. Y.

CANADIANS: Save Tariff. Send orders Greet to THOMESEN CO., Dept.

7-S. All St. James St. West, Meetred & F.S.

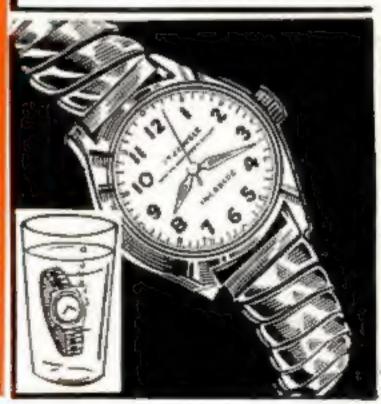
3 TURRET Microscope

Imagine! . resolving torrets ... 300. 200 or 100 power focusing

Finely ground polished Achronatic bross ALL M&TAL construction Frecision-tooled threadings Ideal for lab.

school or bothly one. Sturdy gooden case and dust-groof plantly cover included. Latest, most attractive design Karra sterdy & durable for roughest hand-ling. This loss low price of 9,44 may heret be re-rested again. Send coupon NOW and get this BIG Microscope burgain PLUS a pair of SPECTO-SCOPES, free of cours charge!

No. 198 ... 3-Turret Microscopo & Case 9.44 No tax



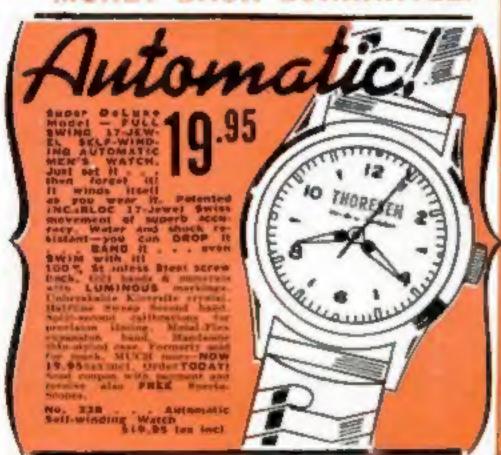
POPULAR SCIENCE READERS

BUY DIRECT FROM THE IMPORTER!

FREE

By ordering ANT article of purchandine on these two passes of spectro-scopes the binords on west like evidence of spectro-scopes the binords on west like evidence of spectro-scopes the many in Spectro-scopes th

-MONEY BACK GUARANTEE!



17 JEWEL-SWISS 9.98 WATER & SHOCK 9.98

A magnificent Swiss watch engineered to high precision standards with world famed incastoc protected movement of 17 lewels. Not an ordinary watch-radically different! You can being it . . . drop it . . . It's SMOCK RESISTANT!

Actually Runs UNDER Water!

Try it yourself at OUR risk . . . if you drop this watch in a tumbler of water, you can fish it out and find IT IS STILL RUNNING—KEEPING ACCURATE TIME! Has deluxe quality features usually found in much, much more expensive watches Stainless Steel back; Sweep Second hand; 1/5th Second callbrations; Radium-Applique numerals; Unbreakable crystal: 17 JEWEL SWISS MOVEMENT; Metal-Flex Expansion band; INCABLOC, Safeguard Gasket. Send handy coupon TODAY and receive this bandsome watch at greatly reduced price—PLUS Specto-Scopes (free of extra charge.)

No. 224 . . . 17 Jewel Swiss Watch 59.96 tax Incl.



Solingen Steel

HUNTING KNIFE

3.95 INCLUDING

The famed BLACK FOREST MUNTING KNIFE made in Saint-gen. Western Cormany of reporting Nicht Rostend con-runting steel is ROW stellable through TMORE-BEN'S. Bugged beauty of this saperts builts has already mor recognition for design in industrial stretch the Continent and its pilling and has hade in a proper favorite with grantened as over furope finds in attantity above as a bountary A finishing and has hade in a proper favorite with grantened as over furope finds in attantity above as court furope finds in attantity above as court furope. However, it were tipped, bounds, in the Tough, startly Mollager Ricel as nower you years of dependable service.

MAKE THIS TESTI

Price a thick metal disc of medaltion on the ground Prings the point of the Black Force, kathe downward. The brain will considered pierro the thick metal with NO damage to the black. The slock, presents lines of this Garman imper(size provide an ideal for from ar den decoration; a dandy get for men! Pend impennd we get 1.95 for know a provicard. Lat & terributed tree of other borns.

Ma. 80 ... Black Forest Knife & Scobbard .. 3.95 tax paid

SAVE

MONEY WITH THIS COUPON!

THORESEN'S, Dept. 7-G

352 Fourth Ave., New York 10, N.Y.

Back Guarantee. () Payment enclosed. Send tax & postpaid. () Send C.O.D. plus postal charges.

- 🖺 No. 6--Pawarhouse Bineculare (\$4.98)
- No. 196-3-Turret Microscope (\$9.44)
- No. 238—Automatic Self-Winding Watch (\$19.55)
- No. 224—17 Jowel Shock & Water Resist, Watch (\$9.08)
 - 🗒 No. 80—Black Forest Knife & Scakbard (\$3.95)

NAME.

ADDRESS.

CITY.....SONE...STATE.....

CANADIANS: Save Turiff. Send orders direct to: THORESEN CO., Dept. 7-6, 45 St. James St. W. Montreal 1, P.Q.

JULY 1954

Founded 1872, Vol. 165: No. 1



Mechanics and Handisvaft EEG. U.S. FAX. OFF.

July, 1954			Page
Waddling Me	nster Pans	California's (Gold., 49
The Great W	indshield A	lystery	55
Hollywood N	ow Shoots	Movies Sidewa	ays 62
A Britisher T	ees Off on	American Cars	66
Sunshine Bee	comes Elec	ricity	71
Tiny Outboan	ds Howl Li	ke the Big Or	ies 74
Looking into	Space with	Radio Eyes	78
ABC's of Col	or Televisio	n	82
They Learn to	Drive Tru	icks at College	81
Rebuilding a	1905 Car '	Faught Him T	rades 92
He Rides a V	Whirlybird	Kite	98
Wilbur Shaw	Drives Per	ped-Up Plymo	outh 104
The Amazing	Growth of	Horizontal Ho	tels112
Beware the U	Jgly Sting !	Ray!	117
Boeing's Jet	Stratoliner.		121
Gus Meets an	Invasion		128
0.1	Shine Un V	our Cor	139
- Ilceful	Make a Re	ach Float	135
5 usund	Profeb a	Vardrahe	136
uleeken	Roild Cor	Rampa	138
Owiects	Silones a	Somenky Floor	130
. hind.	Suchee a	our Car ach Float Vardrobe Ramps Squeaky Floor	
		Dutdoor Cooki	
His Photo St	udio Is Und	er Water	150
What You Ca	n Do with	3-D Viewers	154
They're Old I	Engines	But They Run	160
The Other Fe	llow's Shop	h	165
July 4th Fun	Can Be Sa	fe	173
		ien Show Spot	
The New Way	to Set Cer	amic Tile	182

HOW-TO-DO-IT INDEX of PSM Mechanics and Homebuilding Sections

 July-December, 1953
 197

 January-June, 1954
 201

(More jestures and departments are listed on page 4)

Editor

VOLTA TORREY

Managing Editor

HOWARD ALLAWAY

Art Editor

HOWARD C. JENSEN

Associate Editors

Alden P. Armagnac, Devon Francis, Sheldon M. Gallager, Wesley S. Griswold, Herbert O. Johansen, Martin Mann, Herbert R. Pfister, Ruth Westphal.

Act

Harry Sumuels (Director), Herbert Anthony, Gene Buters, Henry B. Comstock, Mary E. Dee, Eric A. Karminski Jr., Laylen H. Sweet.

Copy

Kendall W. Goodwyn (Director), Carol Ennis, Everett H. Ortner, Trudie Ray, Georgette Sparks.

Photography

W. W. Morris (Director), Hubert Luckett, Orlando Guerra.

Assistant Managing Editors

Frank Rowsome Jr. Robert P. Stevenson

Mechanics and Handieraft Harry Walton

Midwestern Editor Kenneth Wylie (Chicago)

Western Editor

Andrew R. Boose (Los Angeles)

Editorial Assistants

Harriet Trowbridge, Stanley Beitler, Judith Ellis, Louise Levis, Teresa Robbins, Rose Well.

Publisher

GODFREY HAMMOND

Advertising Director

STEPHEN P. GLENNON

Circulation Director

EUGENE WATSON

ADVERTISING OFFICES: NEW YORK-353 FOURTH Ave.; CHICAGO-360 North Michigan Ave.; DETROFF - 820 Book Bidg.; RAN FRANCISCO-114 Nansame St.; CLEVELAND-328 Citizens Bidg.; LON ANGELES-1127 Wishire Bivd.

EDITORIAL OFFICES: 353 Foorth

Published monthly at 353 Pourth Avenue, New York 10, N. Y., by Popular ocience Publishing Co., Inc., Oodfrey hammond, President; Stephen P. Glennon, Vice President and Secretary; Raiph M. Flynn, Vice-President and Treasurer, R. C. Wilson, F. W. Briggs, Eugene Watson, Vice-Presidents, Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter Dec. 28, 1918, re-entered as second-class matter Jaiy 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio, Entered as second-class matter at the Post Office Department, Canada, Printed in U.S.A. Copyright, 1954, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all the countries participating in the international Copyright Convention and Pan-American Copyright Convention and Pan-American Copyright Convention, Yearly subscriptions in United States, its possessions and Canada, \$3.00 (2 years, \$5.50; 3 years, \$7.50); foreign countries 51 per year extra, Four weeks notice is needed to change a subscriber's address. Please give both old and new addresses, including postal cope numbers.



LOST HORSEPOWER can be dangerous...and costly!

When bells clang and sirens scream, you know that the fire engines in your community are on their way ...and you're proud of that equipment, because it's ready to meet any emergency with full, responsive horsepower!

You'll be proud, too, of the full, responsive horsepower in your automobile engine that is equipped with Perfect Circle 2-in-1 Chrome Piston Rings. For 2-in-1 gives sustained power and oil economy for over twice as long as old style rings. In the 2-in-1 Set, both the top ring and the oil ring rails are plated with thick, solid chrome, giving complete wear protection throughout the entire area of ring travel.

Install Perfect Circle's 2-in-1 Chrome Rings and you'll enjoy improved performance and lasting oil economy! Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ontario.

Perfect Circle

2 in 1 chrome piston rings

THE STANDARD OF COMPARISON



Solid chrome pinting on both top and battom rings gives complate wear protection throughout entire area of ring travel. Rings are lapped-in at factory, making tadious break-in unnecessary.

Convegnoring

Build your own FIREPLACE INDOOR - OUTDOOR

FREE Booklet shows how

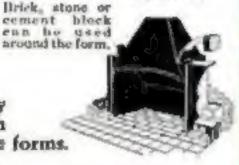
Booklet gives Complete instructions.

- Foundation
- Steel heat-circulating form
- Cold and warm air ducts
- Mantel or decorative front

Save time, money and materials with PRICE steel fireplace forms.



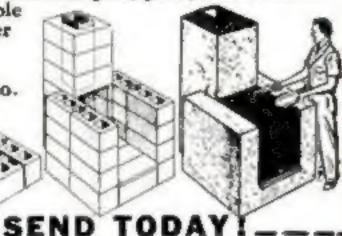




Build this outdoor fireplace in ONE DAY!

 Use inexpensive concrete blocks with the Fyro-Grill steel form and complete the job in a day. Includes grill, grate, draft control.

Removable for winter storage. \$19.95 at Buffalo.



Please send — □ Directions for building heat-circulating fireplace, free. □ Book "100 Fireplace Ideas". Pocket size book, free. □ Larger book, 8½ x 11, beautifully illustrated, 25c. □ Build curdoot fireplace in 1 day. Also.

Build outdoor fireplace in 1 day. Also,
 10 beautiful designs, free.

Name

Street

City.....

DE FIREPLACE HEATER & TANK CORP

225 W. Juntin Streete Muttater Jufferen Barb

POPULAR SCIENCE

News and Pictures

Automatic Control Waters Lawn Daily 77	•
Dummy "Killed" in Crash Could Be You., 102	,
Giant Pumps to Harness Floods103	ì
Two-Story Bridge to Crack Bottleneck 108	3

Mechanics and Homebuilding

Superaccurate Saw Runs on	Tracks126
Rubber Bushings Give New-	Car Ride162
9 Hints on Garden Hose	163
Homemade Rake Cleans Can	

Departments

Letters 6
Last-Minute News and Notes 42
New Ideas from the Inventors 89
I'd Like to See Them Make116
New for the Handy Man141
Keeping the Home Shipshape157
New Tools169
Wordless Workshop170
New Shop Ideas189
Hints from the Model Garage195
Craftsmen at Work200
How Much Did You Learn?254



Joint Job

As a writing team, Darrell Huff (left) and Paul Corey have found that money can be made from the old saw about two heads being better than one. But their literary partnership sometimes confuses PSM editors. When we assign one an article, we never know which will sign it, or whether both will as in the case of their authoritative report about ceramic tile on page 182.

Ex-magazine editors themselves, they are now neighbors on adjoining acreage in California's Valley of the Moon, where each has housed his family in a home he built himself. (Corey's is the fourth house he has put up with his own hands.) For work, they meet in a joint workshop and photographic studio. From there come many of their how-to-do-it articles.

Can you profit by their mistakes?

"Not getting enough education"

You needn't make that mistake. You can get that better job, those big promotions, the regular raises that so many I.C.S. students report. And you can do it without

"going to school," without interfering with your present job or your social life.

YOU can study with I.C.S. at home, in your spare time!





"Wrong choice of career"

When you study with I. C. S. you have 303 courses to choose from. And part of our job here at I. C. S. is not only giving you instruction

but making sure you pick the course that's right for you!

YOU get expert guidance FREE from I.C.S.!

"Failed to seize opportunities"

Your opportunity is right here on this page. Don't pass it by. Don't put it off. Write now and let us send you "How to Succeed" and full information on any of the fields listed below.

YOU get 2 FREE books if you mail the coupon today!



For Real Job Security - Get I. C. S. Training!

I.C. S., Scranton 9, Penna.

BOX 7683-N	SCRANTON 9, PE	NNA.	(Purtial list of 277 courses)
ARCHITECTURE and BUILDING CONSTRUCTION Ar Conditioning—Refrig. Architecture Building Contractor Building Maintenance Corporar and Mill Work Estimating Heating Pointing Contractor Plumbing Reading Arch. Blasprints Steamfitting ART Cartooning Commercial Art Fashion Illustrating	AVIATION Apronautical Engineering Sr. Aircraft & Engineering Sr. Advertising Business Administration Business Administration Business Administration Contifed Public Accounting Creetive Salesmenship Federal Trz Latter-writing temperaturest Managing Small Business Office Management Sales Management Sales Management Traffic Management Stenographic Secretarial Traffic Management Traffic Management Chamillat MY Assiptical Commistry Chamical Engineering	productly backlet about the field CIVIL, STAUCTURAL ENGINEERING Construction Engineering Highway Engineering	Foremenship Industrial Supervision Personnel-Later Relations Personnel-Later Relations MECHANICAL AND SHOP Gas Electric Webling Heat Treatment Metallurgy Industrial Instrumentation Industrial Instrumentation Industrial Supervision Machine Design-Drafting Machine Shop Inspection Machine Shop Practice Machine Shop Practice Machine Shop Blumprints Redriggration Sheet Metal Worker Toolmaking Toolmaking	MAILROAD Air Brakes Car tempediat Oissel Lockmotive Locomotive Engineer Section Foreman STEAM AND DIESEL POWER Combustion Engineering Diesel—Elec. Diesel Engineering Stationary Fireman Stationary Fireman Stationary Fireman Stationary Fireman Stationary Fireman Corting and Spinning Corting and Spinning Corting and Spinning Textile Enging Textile Enging Textile Enging Warping and Weeving Warping and Weeving Maiscellaneous
AUTOMOTIVE Auto Body Rubuilding Auto Elec. Technicies Auto-Engine Teor Up Automobile Mechanic	Chem. Leb. Technician Conney Chemistry Netural Gas Prod. & Trans. Petroleum Engineering Plastics Pulp and Paper Making	Good English High School Subjects Methematics	C Electronics	Marine Engineering Cosan Navigation Shipfitling Short Story Writing Telephony
feme		Ass. Home Add	from.	

A SURE CURE FOR SICK HORSEPOWER!



The carbon gums and tars that form in your engine would make you sick too! —These deposits make your engine sluggish your horsepower balky. Knocks and alow starts are another sign that your engine is gumming uplosing power - wasting gas. Bring your engine back to peak perform. ance with "triple-ac-tion" Permatex "Toon-Oyl"

Toon-Oyl dissolves carbon guma. frees sticky hydraulic valves.

7 Toon-Oyl reduces friction by coat-Zing cleaned parts with a tough

3 Toon-Oyl neutralines acid action— a principal cause of engine wear.

Get full power from your car, Add a quart of triple-action Permatex "Toon-Oyl" to your engine oil. You'll feel the difference in the first few miles you drive. Send for free illustrated catalog.

PERMATEX COMPANY, INC.

Brooklyn 35, N. Y.

Over 50 Chemical Products For Better Automotive Maintenance

Letter's_

Cheers for the Volkswagen

Wilbur Shaw grossly underestimates the Volkswagen in "Europe's Model A" (May, p. 108).

I recently took my '53 VW to Mexico City from Ottawa on my honeymoon. I took five days to get to Monterrey, Mexico (about 450 miles per day). At a cruising speed of 65, I got between 38 and 40 miles per Canadian gallon. On the way back, I tested the car for two days at 50 and got 50 miles per gallon on Mexican gas.

On the New Jersey Turnpike, I averaged



68.8 m.p.h., covering the whole distance in 106 minutes.

The VW is better suited to the American market than any American car is.

ALLAN WHITNEY, Ottawa

After making several 500-mile trips in my VW, I find that I am often within a car length or two of a big Caddy or Olds. Outside of occasional bursts of speed, those big cars cannot average over 55 miles an hour on good American highways under normal traffic conditions. Yet I average over 50 miles an hour on trips here in California. BOB HELLIS, Palm Springs, Calif.

Handle with Care

Your article in April (p. 114), "Nerve Gas Now Kills Bugs," describes OMPA, Systox, etc., as "safe for humans." These organic-phosphate insecticides, like a loaded pistol, are dangerous if handled improperly. They can produce severe illness (1) by in-

Look for the

distinctive

Permatex label at your service

station of garage. It has been

Your Klarables

of quality for

OVER 45 YEATS.



IF you're that man, here's something that will interest you.

Not a magic formula—not a get-rich-quick scheme but something more substantial, more practical.

Of course, you need something more than just the desire to be an accountant. You've got to pay the price—be willing to study earnestly, thoroughly.

Still, wouldn't it be worth your while to sacrifice some of your leisure in favor of interesting home study—over a comparatively brief period? Always provided that the rewards were good—a salary of \$4,000 to \$10,000?

An accountant's duties are interesting, varied and of real worth to his employers. He has standing!

Do you feel that such things aren't for you? Well,

Why not, like so many before you, investigate

LaSalle's modern Problem Method of training for an accountancy position?

Just suppose you were permitted to work in a large accounting house under the personal supervision of an expert accountant. Suppose, with his aid, you studied accounting principles and solved problems day by day—easy ones at first—then more difficult ones. If you could do this—and could turn to him for advice as the problems became complex — soon

That's the training you follow in principle under the LaSalle Problem Method.

you'd master them all.

You cover accountancy from the basic Principles right up through Accountancy Systems and Income Tax Procedure. Then you add C. P. A. Training and prepare for the C. P. A. examinations.

As you go along, you absorb the principles of Auditing, Cost Accounting, Business Law, Statistical Control, Organization, Management and Finance.

Your progress is as speedy as you care to make it—depending on your own eagerness to learn and the time you spend in study.

Will recognition come? The only answer, as you know, is that success does come to the man who is really trained. It's possible your employers will notice your improvement in a very few weeks or months. Indeed, many LaSalle graduates have paid for their training—with increased earnings—before they have completed it! For accountants, who are trained in organization and management, are the executives of the future.

Get Free Sample Lesson—Also "Accountancy, The Profession That Pays"

For your own good get all the facts. Write for Free Sample Lesson—also 48-page book "Accountancy, The Profession That Pays." They will prove that Accountancy offers brilliant futures to those who aren't afraid of serious home study, and

will show the wide tange of opportunities that exist today. No cost or obligation. If you want a position of higher income, greater prestige and professional standing... MAIL THE COUPON NOW!

Over 4,000 Certified Public Accountants among LeSalle alumni

HIGHER ACCOUNTANCY Franciscal Accounting Account of the Marie Problem Marked Practical Accounting Account of the Marie Problem Office of the Marie Problem

L	AS	AI	L	E	E	X	T	E	N	S	1	0	N	U	N	I	V	E	R	5	1	1	ľ
	A	CC	DD	ESP	ON	IDE	N	CE	119	VS'	H	TUT	MOIT	ě .				7		-	7		

417 S. Dearborn St.

Dept. 783H

Chicogo 5, III.

I want to be an accountant. Send me without obligation, Pree Sample Lesson—also "Accountancy, The Profession that Pays."

Name......As.....

Aidres.....

City, Zone & State.....



HOW TO FIX ANY PART OF AN

QUICKLY--EASILY--RIGHT!



Werner you're a beginner now you can 'breeze through' any 'fa-it' job from aimple carbu-reter adjustment to complete overhaul. Just look on Job in index of MOTOR'S brand-new Auto Repair Manual Pol-low simple step-by-step directions, clear pictures. Presto—the job is done!

No guessweet! MOTOR'S MANUAL takes you from "scratch" — shows WHERE to start, WHAT tooks to use. Covers EVERY job on EVERY car built from 1846 thru 1854!

Everything You Need to Knew "Soiled Down" from 140 Official Shop Menuals

NEW, REVISED, ENLARGED, 1934
Edition contains the "meat" from over
140 OFFICIAL shop manuals—simplified
for YOU, 23,598 e-souther repair smedifications on over 083 chaosis car models.
ENE THOUSAND his pages. More than
2,950 "this-la-how" pictures. 233,000
everyes and repair facts, Leads beginners
every step of the way. Time-saving faclary repair procedures for experts. Jaaiructions and pictures so clear you CAN'T
go wrong, Used by U. S. Azing and Navy.

Try Book FREE 7 Days

Make Manual show you what it's gut. Unless you want it's gut. Unless you saree this is the greatest time and work saver you've over seen-return book in 7 days and pay nothing. Mail coupen teday lot MOTOH — Book Dept., Deak 2G. 250 W. Aath St., New York 19, N. Y.

MOTOR BOOK DEPT.

Same FREE Offer On MOTOR's Truck and Tructor Manual

Covers EVERY jeb on EVERY popular make gaseline trush, tractor made from 1048 thru 1934, FREE 7-Day Trial, Check proper box in coupon.



Cevers 685 Models

All These Makes

Chevrolet Mercury

Walser

Made Otherwohile

Lincoln

Packard

Pontiac. Studebaker

Willyn

Plymouth

Builch

Cadistat

Chrysler

Crestey

De Sete Dedge

Ford

Frader Henry J

Hunfson

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

Desk 2G, 250 W. 55th St., New York 19, N. Y. Rush to me at once (check box specific back you want): motor's New AUTO REPAIR MANUAL. If O.K., I will result \$1 in 7 days, \$2 months for 2 months and a final payment of the (plus 55c delivery charges) one month after that. Otherwise I will relays the book postpuid in 7 days. (Foreign price, result \$5 cash with order.)

moyon's New TRUCK & TRACTOR REPAIR MANUAL. If O.K., I will result \$2 in 7 days, and \$2 monthly for 2 months, plus 55c delivery charges with final payment. Otherwise I will return book postpold in 7 days, (Foreign price, remit \$10 cash with order,)

Print 1	Vacous	Age
Addres		*********

... Blade Check host and save 35c delivery charge by enclosing WITH coupon entire payment of \$5.95 for Auto Repair Manual (or \$5 for Truck & Tractor Repair Manual.) Same return-refund privilege. haling the spray vapor, (2) by ingestion, and (3) by spilling on the skin. Treatment is an emergency.

Information as to the proper use of, and the bazards of, the insecticide you purchase should be obtained from the seller at the time of purchase. Read the information given on the container.

> KEARNEY SAUER, M.D., Ass't. Supt., Receiving Hospital, Los Angeles

Says Dr. Robert L. Metcalf, chairman of the Department of Entomology at the University of California Citrus Experiment Station, where the new bug killers are being

developed:

"When properly applied to agricultural crops at normal dosages, the systemic insecticides leave no harmful residues in treated produce . . . On the other hand, the bulk materials are among the most toxic substances known, and every care should be exercised in handling concentrates and sprays in order to prevent human and animal poisoning."

A Rocker as Firm as a Rock

My old platform rocker insisted on "walking" all over the room until I fitted the



feet with some rubber half-soles I got at a variety store. The soles were cut to shape and fastened on with the cement that comes with them.

CLARENCE R. SCHOLES, Los Angeles

In Loving Memory of a '39 Car

Why all the fuss about Kaiser-cum-supercharger (April, p. 124)?

I drove a 1939 supercharged Graham-Paige 135,000 miles. I never replaced any bearings or pistons. Had three sets of rings and valve grinds. Despite day-in-and-dayout, stop-and-go driving, the motor was still in good shape when I disposed of the car. Its cylinder walls were chrome-plated. Five cylinders were okay at the third set of rings and out .005.

This car was 15 years ahead of its time aluminum cylinder head, dual exhausts,



Alas, this is Alec,
whose car polish 'twould seem
Can produce nothing more
than a very thin gleam.

So when sandflies and beetles
fly onto the premise
He appears to be playing
motorized tennis.



Not so, with McPhiter!
He always selects
The easy-on wax
that's rock-hard-that protects!

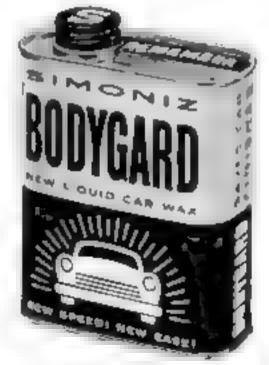
For Bodygard's finish
no bug juices can pass
And his paint job's as safe
as if kept under glass!

(He feels extra breezy, cause the job is so easy.)

MORAL: Use New Liquid Bodygardthe first, easy wipe-on wax that protects your car with this rock-hard finish. Protects 9 times longer than skimpy-shine polishes.

> YOU CAN'T SHINE DIRT, SO CLEAN YOUR CAR FIRST.

Every car must be cleaned before it's waxed. . Simenia Liquid Kleaner cleans better, faster.



True Simoniz Quality in a Liquid Car Wax. Only 984

Copyright 1954 by Simonia Company

1664

This Big Pract and Biok gives full inforin with wireing diagrams constitute to ne set railer or of modern

Diesel Engines, Hydramatic & Fluid Drives Fully Explained.

A complete Guide of ration to w ing inside views of working parts, n to the bone for service jobs

IT PAYS TO KNOW

How to fit | stons - How to locate the piking ray II with fit compactbear ign How to service man harvalves How to ad ust fall be is

II whomas destinate for and closes flow

to rebuild a c ster all with any or automatic transmisshows. How to server tricken How to all ust at r gg at How to come with gration to bles. How to serve to distributes. How to time ignition. How to "tune up" an engine

COMPLETE + PAY \$1 A MO TO GET THIS ASSISTANCE FOR YOURSELF SIMPLY F LL IN AND MAIL COUPON TODAY.

Ste any our worse twith the facts and figures of your trade Autole Hendy Form Fully illustrated and he defect the book ye was for he had he had he had been book ye was for he had been head he had he had



Check

NOW!

You Can Luch Over

Any Guida In Your

Own Home

Start the

mente II Sattefied

Easy Pay-

PAGES

AUDEL, Publishers, 49 W 23 St , HEW YORK Please sending postpant for FREE hair marticle books thanked a frame by a size to keep how as an in that it is 7 beyond he is book or set ordered and in their mark \$1 months on as a book or set ended between pair or set and are been and a book or set and are been been pair or set and a book or set or set and a book or set or set and a book or set or set or set and a book or set or se

A C TO B IS ME HAME ... O THE THE RECEIVE MANUAL 5.5 Fore MA HISTORIAN Y B IN, 2000 Pages

E WE SEE GENERAL PARENT

B SEPTIMENT ASSOCIATION OF PARENT

SHIP MAINTENANCE A SAME AND A PARENT

SHIP MAINTENANCE A SAME AND A SAME M IA4 AL LEAWING bt. on 400 Pages

A . A F W AR H LE MAY S. 184 Pages

EN , HEERS & F REMANS EXAM 5.5 F R &

EN'S NEEDS LI SARY 3 BOOK SALL L MEC ANIGAL DICK CHARY 957 Pages GARTETERS & GR. WEH. G. ES & Brok Self. CARPEN ERS & GROWER G ES 4 BOOK SOIT

PLI MOFRS & Seamht en Gorden (4 Book Set)

MALL MS AND BLICE HS GL. FS & BL. A Set)

PAINTERS & TEC HA LING MAN PAC 450 Pgs

THOUSE HEATING SUITE 1990 Pages

OIL BURNER GU DE 384 Pages

TODAY

THIS.

Name.	 	 	_	 	_	_	 	-		 	 	 	
Address	 	 	_	 	_				 	 	 	 	
Occupation_													
Emplayed by												- 4	67
			_	 _	_	_	 _	_					

mufflers and 110 horsepower. And it was the safest car on the road at that time or since, with a 64-inch tread, front and rear, and 8%-meh road clearance.

So Kaiser could also chrome-plate its cylinder walls and probably have the same land of performance, with the other changes Craham had.

H. T. YUENGER, Chicago

The Boat That Cost \$12 to Build

Tell me, sir, did anyone build such a boat for about \$12 and in 16 hours ("A Boat That Anyone Can Build," Apr., p. 200) before the article was written?

Lumber already has cost me \$63-and that's without any molding.

NICK CHICOLA, Olean, N.Y.

I was deeply impressed . . . I would like to compliment the author, Stanley Stearns, on an excellent job of writing.

KENT ECKHARDT, Alma, Neb.

Stanley Stearns affirms that he did build this boat—several, in fact—for the price mentioned, in a small town in northern Maine, where prices are low. "I obtained my lumber from a local sawmill," he writes, "and it cost me \$60 to \$65 per thousand. Customers were allowed to pick out the hoards themselves. I did use some horrible material from the cheaper grades, as is implied throughout the article. Lumber for the 12-footer cost less than \$9."

Two quarts of cheap porch enamel, four pounds of nails and a pound of white lead

added about \$3

How to Haul a Trailer

I own an 8,900-pound Stewart 41-foot house trailer, and I wonder if you can tell me what make of car, model and transmission would be best to haul it.

S Sct. Fred E. Putney, Shalimar, Fla.

There are as many opinions on engines as there are engine designers. But it seems safe to say that the newer OHV-V8s with a good horsepower-to-pound ratio turn in a

good performance.

Transmission experts split on what's best Some of the early automatics did poorly with trailers, mainly by foaming and oil loss on long, steep pulls. The newer automutics do better, but considerable body of opinion seems to favor either manual-shift or overdrice transmissions. With OD, you

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

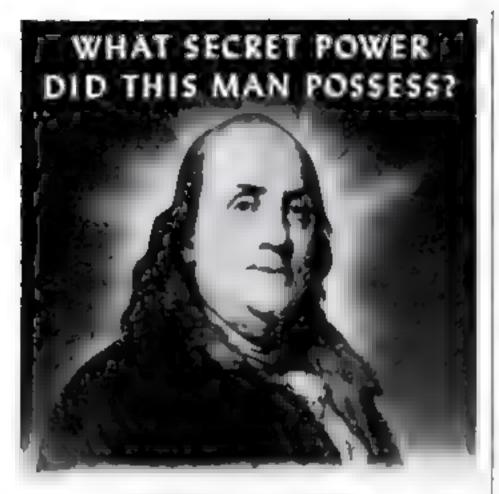
The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Potent Attorneys

42-G DISTRICT NATIONAL BUILDING WASHINGTON 5, D. C.



BENJAMIN FRANKLIN
(A Rosicrucian)

WHY was this man great? How does anyone—man or woman—achieve greatness? Is it not by mastery of the powers within ourselves? Know the mysterious world within you! Attune yourself to the wisdom of the ages! Grasp the inner power of your mind! Learn the sec-

Benjamin Franklin—like many other learned and great men and women—was a Rosicrucian. The Rosicrucians (NOT a religious organization) first came to America in 1694.

Today, headquarters of the Rosicrucians send over seven million pieces of mail annually to all parts of the world. Write for YOUR FREE COPY of "The Mastery of Life"—TODAY. No obligation, No salesmen, A non-profit organization, Address; Scribe H.B.M.

rets of a full and peaceful life!

FREE!



76 ROSICRUCIANS

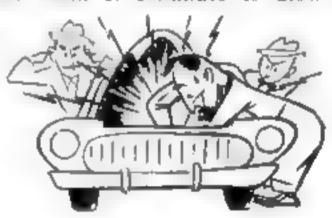
SEND THIS COUPON
Scribe H.B.M.
The ROSICRUCIANS (AMORC)
San Jose, California
Please send me the free book, The Mastery of Life, which explains how I may learn to use my faculties and powers of mind.
Name
Address
City.

can haul the trailer with OD locked out, thus gaining the advantage of a rear end with a high numerical ratio without being penalized when the trailer is parked

Alarm to Expose Car Thief

About two years ago, I had a \$100 shotgun stolen out of my car. In accordance with the time-honored practice of locking the barn door after the horse is stolen, I afterwards devised just such an alarm as George Walton of Pasadena suggested in your April issue (p. 154). I wired it in with the dome light in the car, so that opening any of the doors with the alarm set will start the horn blowing.

The warning device is wired in such a manner that closing the door doesn't turn off the horn. It continues to blow until



someone in the know turns off the alarm switch. This device is designed to protect the car in the absence of the owner.

I'm afraid that Mr. Walton would expose himself to a high risk if he tried the idea he proposed. The holdup man has no way of knowing that the operator can't turn off the alarm once it is set off, and he might possibly shoot the driver if his order to shut off the alarm was ignored.

EARL V. REED, Chicago

Boo-Boo, After All

You didn't make a boo-boo in the article on the new Buick (Feb., p. 146), but you certainly made one in answering S.E. Fried's letter (Apr., p. 12), when you said that the torque in his '54 Chevvy is taken by the rear springs.

The Chevvy is (and has been for years) a "hybrid," just as Fried suggested, and is a semi-torque-tube, semi-Hotchkiss drive, in which the torque is taken by the torque tube, and the thrust, or drive, is transmitted through the rear springs.

ARTHUR M. TROUT, Cleveland

Lucid Reader Trout, one of several who spotted our stumble, is of course absolutely right.

ith Kits I Send You

Nothing takes the place of PRACTICAL EXPERIENCE. That's why NRI training is based on LEARNING BY DOING, You use parts I send to build many circuits rummun to Radio and Television. With

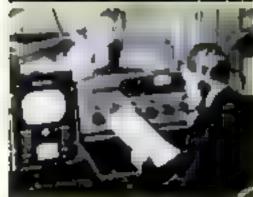
my Servicing Course you build the modern Radio shown at left. You build a Multitester and use it to help make \$10, \$15 a work fixing sets in more time while training. All occup-

ment is yours to keep. Coupon below will bring book of important facts, it shows other enumerment you build.



As part of my Consmunications Course send you parts to build low-power Broadcasting Transmitter at left. Use it to get practical experience. You put this station "on the sir" . . . perform procedures demanded of broadenoting station operators. An FCC Commercial Operator's License can be your ticket to a bright future. My communications Course trains you to get your license, Mail coupon Book shows other equipment you board for practical expenses:

Train You at Home



25 million homes have Television arts now. Thousands more sold every week. Trained men needed to make, install, service TV sets. About 200 television stations on the air. Hundreds more being built. Good job opportunities here for qualified technicions, operators, etc.



America's Fast Growing Industry Offers You Good Pay, Success

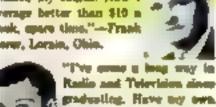
Training PLUS opportunity is the PERPECT COM-BINATION for job accurity, advancement. When times per post the trained man makes the BETTER PAY gets ITOMOTED When jobs are scarce, the trained man enjoys GREATER SECURITY, NRI training can help assure you and your family more of the better things of life Radio is bigger than ever with over 3,000 broadcasting stations and more than 115 MILLION sets in use, and Television is moving ahead fast.

. Training Leads



"Am transmitter-studie operator at KPAT Most important day of my life was when I envolved with NRI - Elmer Frewalds. Madison, S. Dalosta.

Made my Stat \$100 from space time work before I / financed my course. New I average better then \$10 a work, more time."-- Frank Herer, Lorsin, Ohio.





Radio and Television since graduating. Have my own. business vo. Mais Street, "---Jee Travers, Astrony Park, New Jersey.

"I didn't know a thing about Radio, New have a good job as Studio Engimoon at KMMJ." - Bill Delayli, Control City, Nebraaka.



BROADCAST-ING: Chief Techniciun. Chief. Operator, Power Monitor Recording Operator,

Remote Control Operator SERVIC-ING: Home and Auto Radios, Televition Receivers, FM Radios, P.A. Systema, IN RADIO PLANTS: Denga Amistant, Technician, Tester, Serviceman, Service Manager. SHIP AND HARBOR RADIO: Chief Operator, Radio-Telephone Operator COVERNMENT RADIO: Operator in Army, Nevy, Marine Corps, Forestry Service Dispatcher, Akwaya Radio Operator: AVIATION RADIO: Transmitter Technician, Receiver Technician, Airport Transmitter

Operator TELE-VISION: Pick-up Operator, Television Technician, Remote Control Operator



Start Soon to Make \$10, \$15 a Week Extra Fixing Sets

My training is practical, complete; is backed by 40 years of success training som at home. My well-illustrated lessons give you basic principles you need and my skillfully developed kits of parts "bring to life" things you learn from the lessons. I start sending you special booklets that show you how to fix acts the day you enroll. Multitester you build with my parts helps you discover and correct set troubles, helps you make money fixing neighbors' note in spare time while training. Many make \$10, \$15 a week extra this way,

Common — Find But What Radio-Television Utter You

Act now to get more of the good things of life. I send actual lesson to prove NRI home training is practical, thorough. My 54-page book "How to be a Sorress in Radio-Television" shows what my graduates are doing and It pures in terriant facts about your opportunities in Radio-

Television. Take NRI training for at little an 5- 8 month. Many graduates make more than he total cost of my training in two weeks, vert 4GB. National Radio Institute. Washington 1, D. C. that 40th year, The ABC ..

MIL J. E. SMITH, Prosident, Dopt. 408. Medianel Radio Instituto, Washington 9, D. C. Mail me Sample Lesson and 64-page Book FREE.

State .



SERVICING

DRAFTSMEN



CASH BIG PAY CHECKS!

Train Now for more success, greater security

LEARN AT HOME IN SPARE TIME (or at college in Chicago)

Check the want ads in any newspaper-SEE the bigpay opportunities open to you as a draftsman. What's more, you can harn this well-paid prestige profession at home—quick y, easily! No special takent needed. Get complete, at poly step Chicago Tech lessons in the mail spend a few pleasant hours studying each week. In a short time you it be a well-trained draftsman, ready to take your pick of many good jobs. Act now!



FREE INFORMATION MAIL COUPON TODAY! Get FREE TRIAL LESSON plus information about C T C. practical training Learn what successful Chicago Tech tunities in drafting. No charge, or obil-

CHICAGO TECHNICAL COLLEGE

H-322 Tech Bidg., 3000 Se. Michigan Ave. Chicago 14, fillants May me FREE Lesson with information about big opportunities in DRAFTING.

Address

....Zone....State

PREPARE FOR THE BAR



Write Inday for your copy of our FREE book "THE LAW-TRAINED MAN." which deares we the famous Blackstone home study course In har and business law. Als needed instruction material furnished Including big 15 ve me (as I brary Bathelor of Laws (L.f. h.) degree awarded. Minderate Infelon, easy mouthly terms. Write today

225 N. Wichigan Ave. Blackstone School of Law Dept. 120-8. Chicago 1. Illinois Founded 1890

MAKE FETRA MONEY

LEARN HOW TO MAKE test-settime MASTIC HOVETHES PURNITURE RWEST **SIGNS** 1045

There are RIGH OPPORTUNITIES for MEN and WOMEN. with "know-how" in Plactics, Interstate's new Plactics course tells and shows how to make brandroits of fact setting stress out. of Plattice. Given complete training in fabrication, carting, Insuration, mobileg, internal carving, etc., in simple, easy, step-by step language and partners. Plantics and Fabricating Kits for 23 valuable Plastic Brown come with trascage at apextra cost. START A PLASTICS BUSINESS OF YOU'R DW24. No other industry holds such premier for the fature. You can make big many associationing mor-Altiet. Bryt. tigat. etc. In your own house in spare or full. time Don't west! Learn NOW how Interestate's Pleasure.

Freezing qualifies you for sucress in the Plantics field.

PLASTICS AND SUPPLIES FURNISHED POR 23 VALUABLE PROJECTS

ITERSTATE TRAINING SERVICE Dept. C 2G Fortland 13, Oragon

ı

SHORTHAN WEEKS

Write 120 words per minute Age no obstacle—Lowest Cost

Pamous SPEEDWRITING shorthand. No symbols, no machines uses ABC's Easiest to learn and use Fast preparation for a better position. Nationally used in leading offices and Civil Service, also by executives students, etc. 120 words per minute—50 ? PASTER than Civil Service requirements. Over 256 000 taught by mail. The vary low cost will surprise you. Typing available, list Year Behooss in over 406 cities in U.S. Canada Cuba, and Hawali.

WRITE FOR FREE BOOKLET TO SCHOOL OF

Dept. 2607-4, 55 W, 42 St., N. Y. 36



STUDY AT HOME Legally trained men win higher posiand public life Greater opportunities now than ever before More Ability: More Prestiget More Money We guide you can train at haces during spars time. Degree of LL. & We foreight ell text contents including id-values Law Library Law root, can term. Out one reliable id-page Law Training for Landership and Exchange books PREE, Send NOW.

Labally Extension University 427 South Degree Street

A Correspondence Institution Dept. 7834. Chicago S. M.

Build your own JET ENGINE!



Order these plans today

1 JET PROPELLED BJC YCLF Assemble pour own. Photo and sharmedons of ML 2 31 W TO MAKE ENTRACHES WITH STAT JET ENGINE OF ASSEMBLE AND ASSEMBLE AND ASSEMBLE AND ASSEMBLE AND ASSEMBLE NO. MONTH OF ADDRESS OF AN ONLY OTHER BOTO AND ASSEMBLE AND MONTH OF ADDRESS OF A COURT OF AN OTHER AND ASSEMBLE ASSEMBLE AND ASSEMBLE AND ASSEMBLE AND ASSEMBLE AND ASSEMBLE ASSEMBLE AND ASSEMBLE ASSEM

J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio



MANY FINISH IN 2 YEARS

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 57-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL Dopt. #846 Druxel at 58th St., Chicago 37, III.

Without obtigation, please send FREE descriptive booklet.

. Address . .

Canadian Residents: Complete Canadian Course Available. Write American School, 1610 Sherbrooke St., West, Montreal.



TRAIN FOR ELECTRICITY on real equipment in the great shops of COYNE

LEARN ISION-R IN SHOPS OF COYNE

OR in your Spare time at HOME

A FASCINATING FIELD! A GREAT FU-TURE! A good job or independence in a business of your own! TV is growing by leaps and bounds. Unusual opportunity to get in on ground floor in a field that offers a world of job opportunities now and a real future in the years ahead,

TRAINING TAILORED TO MEET YOUR NEEDS

RESIDENT SHOP TRAINING. You learn on real, full sized equipment. Trained instructors show you how-then you do practical jobs yourself. Learn quickly and easily, Finance Plan, Easy Monthly Payment Plan and Part Time Employment Service available to all resident students. Training approved for Veterans, COUPON BRINGS FREE BOOK AND COMPLETE DETAILS.

OR-COYNE TESTED HOME TRAINING, To those who cannot come to the Coyne shops here in Chicago, we offer modern, up-to-the minute training designed to meet Coyne standards. Practical, downto earth, easy to follow, step-by-step instruction, Personal supervision by Coyne Staff—men who know TELEVISION AND RADIO, AND KNOW HOW TO TEACH IT-and the cost is low-you pay only for training-no costly extras. Send coupon for Picture Folder and full details, including easy Payment Plan,



ELECTRICITY OFFERS YOU THE KEY to Fascinating, Steady Work! Good money! A Real Future and Success! Yes, this is a great opportunity field of today. Follow the THOUSANDS who have come to COYNE in Chicago. Train quickly, easily in COYNE'S giant shops-training ambitious men since 1899, LARGEST-OLDEST-BEST EQUIP-PED SCHOOL OF ITS KIND. Practical-Technical method gives practical experience on massive outlay of equipment plus necessary technical training. Send coupon for Free Book and information, TRAINING APPROVED FOR VETERANS.

FINANCE PLAN—Start Now—Pay Later

Enroll now, pay most of tuition later. If you need part-time work to help out with living expenses while at COYNE we'll help you get it.

MAIL COUPON BELOW FOR DETAILS FREE

Whichever type of training best suits your needs, fill in and mail coupon below-check the field and training you prefer and complete details will come by return mail. No costno obligation and no salesman will call.

B. W. COOKE, President

FOUNDED 1889

A TECHNICAL TRADE INSTITUTE CHARTERED NOT FOR PROFIT 500 \$. Pastina St., Gept. \$4-8H3, Chicago 12, Ri. TELEVISION * RADIO * ELECTRICITY * REFRIGERATION * ELECTROPICS

Send details of your offer on training checked below. This does not obligate me and no salesman will call. I am interested in:
☐ Electricity in Coyne Shops ☐ Television-Radio Home Training ☐ Television-Radio in Coyne Shops
Addrem
City State

TRAINED MEN NEEDED

BIG PAY - GOOD FUTURE

TELEVISION DIESEL

_			_	_	_		
П	ĖL	20		•	•	М	œ.
	EL	E	ч		v	Α.	
1	4.1	100					
	ΑI						

WHY WORK FOR LOW PAY or risk being out of a job??? Usually the properly trained man has a ateady lob... through good times or bad. Even back during DEPRESSION there was a big demand for Bailey Trained men.

In only 31/2 to 6 months we can train YOU to enter one of the big pay fields!

No previous experience or special education necessary. With our method of training you do not spend years pouring over books, figures, charts and graphs. You learn by rebuilding, repairing, testing and operating the most modern equipment, under the guidance of experienced, courteous and friendly instructors. This method of training gives you the experience and confidence required to step right into the big pay jobs without spending years as a mechanic's beiper,

It's EASIER and COSTS LESS than you may think to get this residence shop training . . . we belo you find part-time jobs while in school—full-time jobs after graduation. Check subject above in which you are interested and mail for complete information.

MAILEY Technical SCHOOLS **Veteran Approved**

1632 S. Grand

St. Louis 4, Ma.

BIG VALUES IN ATEST TY-RADIO SUPPLEMENT



FREE send for it

Everything for Experimenters, Builders, Amatours, Servicemen, Hi-Fi Funs

Send for our latest bargain-packed Supplement listing big values and new releases in TV accessories, custom chases, High Fidelity systems and components, P.A. systems, re-corders, FM and AM radios, Amateur supplies, test instruments, builders' kits, electronic parts, tubes, tools and books. Make your selections from the world's largest stocks of electronic supplies at lowest, money-saving prices!



ALLIED RADIO

100 N. Western Ave., Dept. 7-G-4 Chicogo 80, Illinois

Send for Supplement



ALLIED RADIO

You Can Earn While You Lo

AT HOME prepare for blg opportunity uphabitery field with practical N T State approved I pholatery Trades School tourse Be your own Bass get big pay job pay for training with spare time escalage white learning

You learn professional custom furniture uphalitery temphonier) also covers for wave finishing repairs, window carnice engineer and dragery making FREE ALL tools, frames materials and fabrics you use to make 3 benutiful pieces of aphabitered furniture and alip rovers yours to keep or said Course asso Undudes apeals: lesson flow To Start Your tiwn 4 absolutely Business and Whalesais Supply Service prise eges

FREE Distrated book Your New Way to a Successful Career tells about this bill too dollar field theid spiness stories of l'TS gradus est Write tuday Train ing to N. T. School also available I photocry Trades School, Bept. CL 1507, 721 Broadway, N. Y. 3.



Alvin Loderkramer, fermor auto machance says, Doubled my latema in fore thee m PAGE OF B bullton up-



Sample the had playe may must pay in a private can had a nationally on he frost factors had being prompt about pass hear Hotel got grown a tire as I sustaillams Epiden-

from friends, brighters, decisis a plan Mad Coher, Hipstrated are rate of he experts in associate his in a language AND blooming also Crabid plants and at 40 0158. Everything you need to that for plants or profit FREE for its as a SEND to thought Write today. Two Icas PLOWERLAND, heps 27 4822 Withhire Las Angeles 2, and

MAKE MONEY Synches.

Home of If you are OVER 27-good pay, You contact you in abotography first a region of pun in motography fileri a in his once as you learn to coate money in ways with your amore. Our famous, los cost I KARN BY DOING method and INDIS 104 4), puldance bring out questly at bome; Write TORAY for FREE mater of Alin Resident Transaction 4th Year Of Appropria

NEW YORK INSTITUTE OF PHOTOGRAPHY



NOW! START MAKING MONEY IN RADIO - TELEVISION

Send for FREE BOOK, FREE LESSON and FACTS on amuzing new home training plan! RADIO-TELEVISION TRAINING SCHOOL INC. Dept. PS 7, 3100 South Vermont, Los Angeles 57, California



INVESTIGATOR TRAINING

Experience unnecessary. Many opportunities. Send for Free particulars. Free credentials

EXCHANCE SECRET SERVICE SYSTEM

4000	DED	ROWN	У			Chica	30	13	, ,	ш
		MAHL	COMPON	FOR	OVICE	ACTIONS	-	-	-	-

Exchange Survet Service Systems 4349 Brondway, Chicago 13, 16,

Without cost or obligation please mail Free particulars

Address....

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are your laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS
1423 VICTOR BUILDING, WASRINGTON 1, D. C.



Get into Good Paying UTO BODY and FENDER WO



BIG DEMAND in Auto Body and Fender work. Start training now in your spare time at home for good pay work. Practical shop experience included. U.E. I. Training covers metal work, welding, painting, etc. Placement service or we will show you how to start your own shop. Behand U E ! TRAINING!

a large national organization founded 1921 Write today for FREE FACTS-No obligation.

Free Facts

SIVISION . UTILITIES ENGINEERING INSTITUTE AUTO-CHAPTE

RE SELF-CONSCIOUSNI



How to develop a strong positive personallty—get rid of timidity bashfulness shyness and fear Successful tell-instruction
lessons based on new principles of practical
psychology Healthy sell-confidence can be
yours Complete course of 22 home study
lessons NOT a book. Pull price only 66 55
postpaid or COD plus postage Mailed
in plain wrapper Salisiaction guaranteed or refund,
Curing Self Consciousness Course today
Hall Ca., 210 5. Climton St., Dopt. 20W-1. Chicago 6, III.

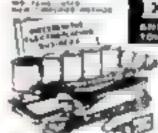
sealed in Order Nelsou-Hall Co., 210 S. Clinton St., Dept. 20W-1, Chicago C. III.

PAYE US SEND FOR FREE, BID, BALDS-TRATED CATALOR MOW! Catalors of report Trate and the send of the sen

TELLS

HOOM

WEAVER SCHOOL OF REAL ESTATE EN 1975 Swite 300 Law Bidg. Dept. PS Kareau City, No.



HOW, Being NEW picting hit, it o many to restropinte any abject Comp per hit grad neutropinte any abject Comp per hit grad new thetai where a with chief was full data on obtaining at the full bray put desire and make \$10 midwey for or spare time Only \$5.55 SENO FOR MONEY reven him of the action of E. NATIONAL BALLS.

CUD

FROM FOREIGN LANDS-Exciling, uneful sample, products from France, Germany, India, etc., sent to you. Established Import-Raport firm offers men or women FREE plan for big profit, world-wide, mail-order business at home; or

travel abroad. No capital or previous experi-ence needed. Overseas bargains bring high U.B. prices. Write today for FREE plan! Mcllinger, Japt. A217, 1717 Westwood, Los Angeles 24, Cal. YOU LIKE TO



Enjoy drawing, painting, advertising art and cartooning at home in your spare time. Earn while learning Step-by-step method helps beginners quickly. Low tuition, 40th year, Send coupon for free booklet. No salesmen.

	Send free "Art for Plessure	4 Prof
Washington	Materia.	
School of Art	Address	up-
Squalles 1.37 M Washington S, D.C.	City Enter, State	





BE YOUR OWN MUSIC TEA

Send for Free Book Telling New Easily You Can Learn Plano, Guitar, Accordion, ANY Instrument This EASY A-B-C Way

NOW IT'S EASY to learn music at home. No trasome "exercises," No teacher, just START RIGHT OUT playing simple pieces. Thousands now play who bever thought they could. Our pictured lessons make it easy as A-B-C to learn to play popular music. hymns, classical and any other music. Only a few cents a lesson. Over 800 000 students! (Our 58th successful year.)

FREE ILLUSTRATED BOOK



Find but why our mothed can reach pour mick y dust is strength out tooch took what athere was Make a upon the automated Proc. Book No others in No on company will call the control of the con No cut got on No to remain will rail no cut got ment us school of Music, States 137 Port Washington, W T Spare Reduced Prices on instruments to pur atmosphs 1



U. S. \$1	CHOOL	OF MUSIC.	Studio 15	7, Per	t Wasi	ington	ı. M.	٧.
plas (No	end me ime Snel	hanen));	Illustrated	Free 3	louit. J	madiq	17110	64

Instrume	est		 - 1 - 1	++	1 +	Bave you Instrumen	1 47	
Name		-	 (Pleas	e Prin	4.1		-	
Address		 +		,				

DWN THE "BOAT OF YOUR DREAMS"

You'll find just the boat you want in the BOAT HITH DER'S HAND-HOOK Compilete blue of materials, step-by-step instructions and acores of photos and d agrams, make it assy to boild YOUR boat Each boat is skill fully engineered for fast assembly appealably dealgred for case of construction niety, attempth, seaworthiness Here are the 10 boot plans you get:

- -10-21 Outliness Hedeuplane -14 5 Pr Hawk-mowith Storm Shorter
- -. O. Pt. Spendy (butboard Hydroplane
- feft, Cutbrard Lillity Ennecessit
- -this ft. Double Cochait Gulbourt
- -10-ft Folding Partable front -14-ft Act Little Chief Cance -14-ft A. Poweriard Puddlebourd 18-ft ft. Untbeard firestates
- 16-ft Duck Heat weight 60 fbg.3 - 18-ft. Inboard Step Hydropians
- -8 ft. Car Top Fishing Boat
- -19 Ct Pariable Salibest Hat Rad' Speedster
- -8-ft | Mat Rad' Spe -10-ft, Sailing Dinght
- -th ft. Utility Duthward -16-ft Appedy Updingerd
- 17-ft. Shallow Draft Page Book
- 12-ff Livery Schoter -13 's ft Beamy Utility Buck
- ~ 16-ft Matti-Purpose Sloop -Bort-Sall fee Boot for \$40
- -17 ft Outboard Cabin Cruises
- -Water Bergie Paddie Stat

 -1] ft Class B' Gotheard Racer

 -2 ft Outboard Highly Scat

 11 ft ft Outboard Willity Scat
- 18 it Speedy Outboard Renabout
- -1614-ft. Inhound Runahoul designed. For Jeep motor
- -18-ft. Combination Karak-Cuses -24-ft. Sec.-Golpa Motor Sailer.
- -11 It Car too thatheard Hydrophese
- -19-ft. Hou Stad



Build Your Own Beat! (t's Ensyl

Now you can build your own boat! From an 8 ft. Hot Hod Speedster to a 18 ft. Sailboat or 17 ft. Cabin Cruiser, it a cosy, and it a five, with the BOAT BUILDER'S NANDBOOK ... the encyclopedia for the amateur boat builder. Think how proud you'll be when YOUR boat hits the water for the first time!

This big, 192-page handbook gives plans and complets instructions for building 33 Defferent Bonts, Also explains bow to make fulleize boet plans, recondition your boat, take care of your outboard motor, power your boat with a converted Model A Ford engine, built a

safe mooring, plus a choice collection of handy kinks. Send Mc Inday (NoC. O. D.'s please) for this hig handbook

SCIENCE AND MECHANICS MAGAZINE

450 E. Ohio St., Dept. 3448 Chicago 11, Mineia

CROWING AT HOME! - DENIEL YORK: - NO TREATMENT ATTREE



It's New! Amazing! FULL GROWN living dwarf frees - only 12 INCHES HIGH? Elm, orange, oak, cypress - any kind All BLOOM and even SEAR FRUIT Perfect, healthy specimens, but in historic Make costly home decorations and beautiful expensive cen-igniferes soid for over \$1500 each). It a easy' Fun' A new fascinating at 1 suc HOBBY — a new fabulous \$33333 81 SINESS' Real seed and sensational hen growing secret plan deta in BOTH

GENUINE SEED AND PLAN

NATIONAL NURSERY GARDENS, Dupl. N7 6463 h. Van Ness. Inglowmed 4, Calif.



YES, Build your own tog-quality TV set. We supply complete equipment, tools, instruction as part of America's finest blame-Study TV Course. Be a highly-paid TV Technician. Install, Repair, Service all makes of sets. He asperience seeded. Many excellent jobs now open. Or start your own business. Seed today for hig FREE Book, "You and Television." Commercial Trades Institute, Dept. T1-7, 1400 Greenical Ave., Chicago 28, III.

WHO LISTENS TO YOU?

that Commands Attention!

Do people listen when you talk are they impressed favorably an that they have gree or confidence in you friend these toward your find out about makes or method that makes it possible for you to have a trained toke Just a few minutes of your a set time to your own home can work wondered A man with an untrained to re is handlessed in many ways make the most of yourself in having a viter that leaves the best possible timpression. Write today for remarkable Fifth book of How to Herrish a Successful Votes." My led outpast in piech wapper 5 are are Prefer Votes insights 210 5. Climton 34 Studie GW-1 Chicago 5. III.

WHERE WEIGHT WIFELS

-						40.0			•	
7-	Oisc.	Wheel	Aur Tr	ire bu'	dlesve.	,	+		56 4	
- 61	DISC	Mr Is med	13 %	Tice i	2 Bicrys			71	D¢ (ea.
					ball bear				DC 4	
40	Ortic.	Wheel	145. 7	Title 1 :	bell b	Par long		11 9	90	24
91	DINC	Wheel	1 30 1	remit b	orum, T	Print 2 -	E.F.	311	2	PR
- 51	0 10	Muces	3, 360	M Cuto	MINI T.			33.5		76
10	3610	AN 12 In the I	1 23 9	Lund - Dr	antitell. I	7	4.0	11	X.	35-
13	DIRE	Mucal	1 43 1	PL MI DA	nm T. neum. T neum. T	W	- 7-46	111		
17.	Ser Acc	the true is a	a dealer	et a but	rep Man	Postara	C 0.1	N 's see	and the	nd.
200	F-10	De la lace and	a the ref	1 1-		al la ales	- Wash	halma d	F. 14	

12131 S. PEORIA STREET PS-7 CHIC IGO 42 (LLINGIS

NEERING

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHAN-ICAL and BADIO ENGINEERING (inc. TV and Electronics),

Hundreds of young men are saming # 5. EMBINEERING DE-QUEEN among by in the resugnituded does tottom year around top-enation. New terms start masterly Many exploses each a major part of their college expenses in this large industrial center.

Low tuttion. Competent instruction. Thorough intense, practical program Minders were support to an doca in, noting new physics shops one and modern wind tunnel Individualised instruction emphasized

Gor's approved for G 1 * Engineering preparatory gaugest, udents from 46 stales and 21 foreign count * Enter Siglification becamber March June Send couples for tree catalog and full information Enrol, now.

---- SEND COUPON TODAY ----

I INDIANA TECHNICAL COLLEGE

674 E. Washington Soulevard Fort Wayne 2, Indiana

Please send me free information on \$, 5. Engineering degree in 27 months as checked.

Aerecautical, Chemical, Civil, Electrical, Mechanical, Rad o Television,

CHU	 1114	* 8.48	 	

MAKE \$15,732.00 IN ONE SUMMER \$9,584.00 WITHOUT LEAVING YOUR HOME

Union you are near a healthy fire extinguisher or a plentiful supply of WATER We cannot assume responsibility if this ad breaks out in ROARING FLAMES. So please do stop reading this until you have taken the necessary safety precautions. Yes, we have an item that's H O T -ab li O T that we are not going to say other than the usual words of a good product for fear of setting this good magazine on FIRE. This product is NEW! SENSA-TIONAL! COLOSSAL! AMAZING! and REVOLUTION-ARY -NO! No long story-All we have to any and this is modestly, we have an ELECTRICALLY controlled bulb that is the BEST insect killer CONSOLIDATED RE-SEARCH has been able to produce—bar none. Not to be compared with any other unit ever sold.

Testimonials like these are pouring in by the hundreds.

"It works like a charm. I om amazed at its results "- Mrs. Wills, Atlantic City,

"Your magic hulb has at last solved my roach and fly prob-lem." - Mrs. C. I. Thompson, Miami, Fla.

"Has given my family endiese hours of comfort laving -Mr P V Zane, Los Angeles.

You have heard of the 7 Womie's of the World Produces on or its ed sessenthing offices the III. Worlder an autout a MUST on west, haire and erfablishmen. Ben a heiten be salestion as the bigger MUDIT MARCE wides the appening of the

absolutely everyone

Now that you have taken the safety precautions, read every word in this ad, as we have said above, this item is HOT, so hot that to be extra safe we have ordered the publishers not to use any RED ink. Now, getting serious, fellows, here a the

scoop. We are going to do EVERYTHING to make you the most welcomed salesman to ever approach a customer. We will give you GLOSSIES, MATS, IMPRINTS, all the material needed for an immediate mail order set up, also documented test reports of how promment colleges and testing labo, RATE our product, also at your disposal is a powerful pulling pitchman sound T V movie on Bug Weapon. The production

value of this film cost us more than \$2000 00. PLUS BELIEVE IT OR NOT an advertising allowance. We will PRE-SELL this Bug Weapon for you, by launching a tremendous advertising barrage, including almost all national magazines, radio, and TV. The entire population of the U.S. will be put in a buying mood. Especially so since hundreds of insects will help you make every sale. They will dive bomb about him, molest his comfort, interrupt his sleep, destroy his property, and spread contagious duesaes about his home, and food. Business establighments suffer enormously combating the ugly insect problem. They wal greet you with arms wide open. It's a tested natural with STAGGERING public acceptance and mountainous profits. Yes, you will be WELCOMED, you will be THANKED, most important you will make MONEY.

VOLUME SALES CORP., Research Dept. 5-7 2000 Market Street Philadelphia 3, Pa.



Not a gadget — not a balfway measure. Not to be compared with filmsy, entried instations. A finished quality appliance. Carries as traceled 18-year quarentee and parts replacement policy. Sound by Lignature.

entriers of 13 comm strendle dis-cases including FOLIO, the fly can reproduce A publish others. Fitte seldom leave anything without first exercing on it. Don't take chances with your besith.

YES, you can now insect proof your home without afting a linger Throw out said faultimed By montters, and heavy spray gum A how amail clean, decarative. I the built enables for to destroy numbers of types of march like made. Only one 2 hour at declaration keeps kill by discuss corr) he destructive and armog-lux insects armont the check for more than 2 weeks. More power-for than 1:25 T yet harmless to hanne petsand dalls. Approved BAFE. Not a gallet not a half way insecure Carries a hor way insecure Carries a hor way insecure carries a hor way in the contract of the country in the con-mittee of your maney results for some sent of several ands. How here, one send us a check high carry but destructive and somey-

NOW Everyone and us a check hitten or making for \$2.98 & 12.12 is accepted through your unit decide that you would oke to join us in the sales of this new public servant as will refound your \$2.98 insking your unit ABSOLUTELY PREE.

ODORLESS . SILENT MYSTERIOUS

DEMONSTRATOR COUPON ..

- 🔲 Enclosed is \$2 🐿 Sood and you you for any particular site.
- Chiclosof is \$2.00 in cash, check or M.O. Bush we one 20th CENTURY BUG WEAPON with sales aids, and cOWER unpressely praces. However, should I become an active sales man, upo of the Volume Sales Detfet are to REFUND my \$7.98 meshing my demonstrator. FREE Forthermory, I must agree that overything you say be cree ut t well retain every the ne for a retund
- Send non MONEY MAJURG sales till C 0 0
- Lead tions in last money. Bush and ... dozen BUG WEAPONS, at p. South larger in include my FREE demonstrator and asian under C.O.O. dozen BUG WEAPONS, at your wholesale price-
- Tagether with the engineed order don't larget to show me how to make \$4.37 on each \$2.50, \$15,732.00 to one summer 28.504.00 welraged blavely my home.

ADDRESS

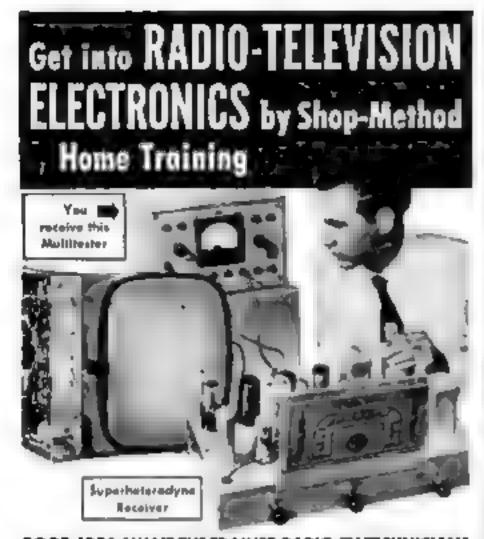
CITY

STATE (Moreham of the Mari Great Business Gureeu)

VOLUME SALES CORP., Research Dept. S-7 2000 Market Street

Philadelphia 3, Pa.

ABSOLUTELY EVERYONE MAIL THIS COUPON NOW!



GOOD JOBS AWAIT THE TRAINED RADIO-TV TECHNICIAN! Business of Your Own + Broadcasting + Radio Monufacturing, Sales, Service • Telecosting • Television Manufacturing, Sales, Service • Laboratories: Installation, Maintenance of Electronic Equipment + Electrolysis, Call Systems + Theatre Sound Systems, Folico Rodia - Garagos: Auto Rodio Solos, Sorvice • Sound Systems, Tolophone Componies, Engineering Firms, etc.

WE BRING NATIONAL SCHOOLS TO YOU! There is a place for you in the great Radio-Television-Electronics industry when you are trained as National Schools will train you at home! OUR METHOD IS PROVED BY THE SUC-CESS OF OUR GRADUATES SINCE 1905

YOU RECEIVE PARTS for Signal Generator, T R F Receiver. Audio Occiliator and Superheterodyna Receiver, plus professional Multitester shown above. No extre charges.

EARN WHILE TOU LEARN-we show you have!



APPROVED FOR 0.1. TRAINING

MASTER ALL PHASES! Get Master Shop-Method Home Training from an Established Resident Technical Trade School with its own Training Shops, Laboratories, Studios-almost 50 Years of Successful Experience in Training Ambitious Men.

Technical Trade Training Since 1905 LOS ANGELES 37, CALIFORNIA

In Conside 811 West Heatings Street, Vencover, B. C. BOTH HOME STUDY AND RESIDENT COURSES OFFERED

MAIL NOW TO OFFICE NEAREST YOU!

[mail in executate or parts on postal cord] NATIONAL SCHOOLS, Dept. RC-74

4000 L FIGUREOA FYEETY LOS ANGELES 37, CAUP.

323 W. POLE STREET CHICAGO 7, HL

Please rush FREE RADIO TELEVISION BOOK & FREE LESSON No obligation, no salesman will call.

BURTHDAY ..

ADDRESS

EONE.

Check if interested OMIT in Resident training at les Angeles.

VETERANC: Give date of discharge.

Sensational Device Tests Eyes



MAKE BIG MONEY QUICK—FREE SAMPLE KIT!

Show it to friends and others. Let them use it Free and watch their amazement over this delf Testing system. Here is a great new opportunity in a tremendous new field of untimited possibilities. Spars or full time. Set experience needed. Write for Free sample kit.

C. Q. Optical Co., Dept. A-234, 30 E. Delawara PL, Chicago 11, III.



PHOTO-ENGRAVING PLANTS



MATERIAL COST

Establish your own profitable PHOTO-EN-ORAVING business. Make cuts for newspapers. printers, and advertisers. Make eithed name plates, pluques etc. Instructions furnished, no experiency necessary, Sold direct from factory since 1931. First five hundred cuts sold locally or by mail will pay for plant and pay you well for your time, Write for FREE catalog.

TASOPE, DEPT. P3-7, AURORA, MO.



120 PAGES ... Craft Supplies. Tools, Designs, Instruction Books from America's Largest, Most Complete Handcraft

Send for your free copy NOW! GRIFFIN CRAFT SUPPLIES

5626-B Telegraph Ave. . Oakland 9, Calif



I'll Send You This Handsome SAMPLE CASE-FREE



and Show You Now to Make Up to \$30,00 in a Day

Mail coupon for this Free Te loting Sample Case packed with 150 beau-tiful, has value sult and overroat tabeles. Take orders from friends, new workers, others for fibe unity made to-measure riothes, whell his mad profile in advance.

for you to get your own circles without it cost. No argument is partied out and over the second of t

STONE-FIELD CORPORATION, Dept. N 518 332 SOUTH THROOP STREET - CRICAGO 7, ILLINDIS

AT LUST! THE BUTTERY been clamoring for! 10 Year



"I will pay \$1,000 cash to anyone who can disprove the claim that Life-Long Battery recuperates in 1 minute."

STATE OF THE OWNER, TH

There is no trick to it for a the lafe lang 10 Year Bonded Guarague the fight bone barrers provided from tidor a man port of a grow in the present of the decide of the manufactual made pend of looses, is to a larger to construct and exercise the found with any diser-



Letters Pour In Praising LIFE-LONG Battery

"After careful consideration, I finally chose the Line Lang Battery to see us through this gracting 2000 P. Le PUCE

F H C., a nationally known rore driver, South Hadley, Mass

BONDED

Guarantee

Have just a run led another order and certified North for cartond 759 Life-Long Batterles, for North and a our Way ern Most distributor Ship order t unce Stock on yone. His customers acreaming for mo. c

D. W., Lafe-Long Distributor

"A month ago I sow a deliberate attempt to rule one of your batteries by a fleet truck owner and after adopt of abuse when it was still going strang, I have difficult my next battery would be a Life-

J. K. Colorado Springs, Colo.

Withstand

Sub-Zero

Temperatures

F () 12 ()

You Can Make This Test

Install the Life-Long on your can the same as any other battery. With ignition award off and ten ights on kiel on Starter Hotel battery is an run down I went . rank the engine, or right the lights Now Wait one minute with headlights off then step on starter. The l. le-Long Battery w l. start your engine costantiv with a suite of power it has regained during that 60 second interval

This European invention is the Only Battery that's built to OUTLAST the Car! DUTPERFORM ALL other Batteries' OUTSELL all Competition Yet it Costs No More!

Deliver 300% Greater Capacity

PATENT PENOING

MONEY BACK GUARANTEE

WHY RISK BATTERY FAILURES? Test after test proven the Life Long's ability to deliver up to 300 AMPS Instant Power Output at

all temperatures to 70" below zero, and to re-charge itself almost instantly. Now you can buy a Life-Long Battery for your car or truck at the cost of an ordinary battery

Have Tremendous

Self Re-charging

Ability

DISTRIBUTOR OR DEALER TERRITORIES STILL OPEN

Protected Distributor or Deal er france ses are being awarded to interested people. Trose who arready own frame 1564 are card by excel ent probes see telegram quored above as more and more car-owners learn about Life-Long 10 Year Battery We invite your in quiry by telephone telegram ot letter Min mum investment in inventory. Because territories are going fast, we urge you to act now

All Life-Long Batteries are sold on an unprecedented replacement or money back guarantee. This exclusive 10-year guarantee makes the Lufe-Long Battery cost less, year for year, than any other battery sold! You can't lose, so why wait? If dealers cannot supply you, mail this COMPOR.

r manufacturing corporation 11766 W Pice Blvd., Los Angeles 64, Colif. Cable : LIFELONE

LIFE-LONG BATTERY MFG. CORP., Best pg.74 11766 W. Pico Blvd., Las Angules 64 California

Please ship I te-lang Bottery, 10-year guarantee: 6 walt an emetive hattery (\$29.95 including tax) 17 will automotive but cry (\$34.95 including tax)

Make & Model, Year of Car.

Cash check or money order enclosed Life-Long pays as we every costs to your door

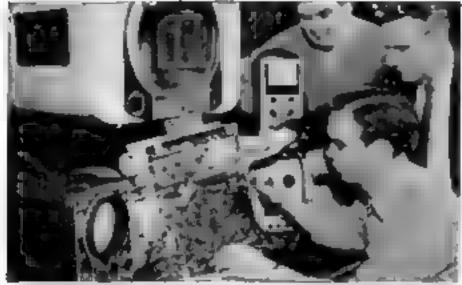
NAME

A DOMEST

ZONE STATE CETY-

Become an Electrical Engineer with Bachelor of Science Degree

in 36 months





Major in Electronics or Power at Milwaukee School of Engineering

Over 50% of the nation's industrial leaders began their careers with engl-

neering training. Prepare now for a rewarding future as an Electrical Engineer or Engineering Technician. Enroll at the Milwaukee School of Engineering

Plan Your Career — Eight Courses Give You Wide Range of Study

ENGINEERING COURSES Electrical Engineering-Bachelor of Science Depres Save a valuable year through optional year "round study, Electronics majer _____ ...Jå months Power major Jo months TECHNICIAN COURSES Feetro Technician 12 months Emeleanic Technicion12 months Radio Technician 12 months Radio and Television Technician _____ _14 mostle SERVICE COURSES _ 4 months Etectrical Service Rodlo and Television Service ______12 months

Terms upon July, Sop tember, January, April Approved for vaterons. Pr or My Hary, Practical or Academic fra ning evolutied for edvances credit Poculty of special lata. 50,000 former students. Annual enrollment from 48 states and 23 overseas countries. 51st year Non profit, Rest

MECHANICAL TECHNOLOGY COURSES - Also available, Service and Technician courses 6 to 18 months — Healing, Refrigeroben, Welding, Air Conditioning and Mechanical -B 5. Degree in Mirchanical Engineering with a motor in Design, Metal Fabrication, or Plant Eng neering Also, general 3-month preparatory course.

dence courses only, Sand handy coupon today,

MS-11



7	
	MILWAUKEE SCHOOL OF ENGINEERING Dept. PS-754, 1025 N. Milwaukee St., Milwaukee, Wis.
	Bend free filustrated career booklets [Electrical Technology [Madio Television.
;	I am interested in (finine of course)
	Kame
	Address
	City State
:	If reteran, indicate date of discharge



BECOME AN EXPERT IN

Trust man name \$4 and to \$10 and and up. Thousands of firms need of feet a man we have a man We train you thought in sport the a hard of the color of the property in the property of the property in the property of the prop 1 art Marie eine b. Ce bas minim Profituefet.

LASALLE Extension University, 417 Se. Dearborn St. A Correspondence Institution, Dept. 1827, Chicago S. | II.



Dopt. 1970 Pleasant Hill, Ohio



LEARN LOCKSMITHING

Learn this feecinating, profitable trade Age or physical haudicap no disadvantage. Year around steady income Full or part time Practical Limitrated lessons You can make money even while learning Al. materials and special tools supplied without states thereo

LOCKSMITHING INSTITUTE. Oupt, P\$-55 14 PARK AVENUE SUTHERFORD, N. 4.

Appropriate the Processes

Just a sarea do call no number tricks Make per pay map of your marvestus legals as on it is not a next map personal figures set used to be in a next map personal figures set used volume, why a hard on the form, the first pay of Santa and the first set of the set o Luara Short-Cut Mathematics

lettete ked out problems answers, old Sense tone, barga in y 52 to postpaid or CDD have post-ate by 50 in respect or refund, bear to a

NELSON-HALL CO., 216 S. Clinin St.

52.93 Complete





\$8,000 to \$15,000 YEARLY INCOME!

MR training has been fully proved in practice through its fine resident achouls. Arme graduates reput outstanding promutions tenulting in higher saures Prouve and easy through temes famous "COPE" Progress Is hystem. Prepare yearself In YOUR SPARE TIME for a secure position of responsibility and high earnings, and quality at a time when you will have every apportunity to rise to a position in the \$8 15,000 per year salary bracket Be successful—Co Farther Faster

I I ad a Land of Kenega Leterans Training 12

ACME SCHOOL OF DIE DESIGN

DATION 2 ONIO Wrds Currespond nor Div . Dept. 5

SAVE MONEY On 1,001 Home Repairs

Rush postcard for 7 DAY FREE TRIAL of amazing new book, "BASIC HOME CARPENTRY," Over 300 pages, more than 500 "how-to" pictures! SEND NO MONEY NOW! If more than delighted, remit only \$2.95 plus pastage—or return it and owe nothing! Dept. 807 WM. H. WISE & CO., Inc., 50 West 47 St., New York 36, N. Y.



Why spend all your life at data backbreaking work? Watchmaking is light clean fascinating Lifetong live shood the quick Sweazey way at home or Chicago School Monern mathods slop-by-stop No provious experience needed in div luni training Start any time. Approved for vets. Send for FREE samp e losson. No obligation, Writel

CHICAGO SCHOOL OF WATCHMAKING 2330 N. Milwaukee Avenue, Dept. 474, Chicago 47, Illinois



World's-Standard CONVERSATIONAL METHOD

FRENCH BPANISH ITALIAN GERMAN RUSSIAN

any of

28 Lam-

EUREGE

Are interesting job travel ou urn; grmed services' opnortunit as passing you by because you sheak only one tongue? Learn another language AT HOME the some natural entry was you learned English long before you went to school YOU LIEVEN you hear PORTUGUESE TOU SPEAK. Worldwide educational audorsement pref & m i no home study students of all ares pref BOOM, 'Passport to a New World of Oppor-tunity.'' gives fascinating facts WESTE TODAY!

LINCUAPHONE	DISTI	rute, 1	47-47 (ling, M.Y	. 26, N.Y.
Send top your	PILEE	book	E Writing	to feera		janguage.
Name					* 1 *	
Address						
City, Zona A :	State		_::_			





Let us show you how extremely easy and PROFITABLE is in to make hear that the and perfor things not of LIQUID PLASTIC LIQUID MANDEL LIQUID AVORY, LIQUID BLASS CERAMICE. ETC.

THE LIQUID EVORY, LIQUID BLASS CERAMICE ETC.

THE WAY in position water out of a gineal state possities for any efficient with a tools days. Paderia, retain to meet the meetal things. We supply everything MITERIALE and AMSTRUCTIONS! things We supply everything the state and the meetal things we will be used to earlier east a retainfacter book. THE WONDERS OF LIQUID PLASTICE!"

[Date | December 1 | D

PLASTICARY COMPANY, (Dopt. A)
737
(i) rither official Pole Atto Care 4.0. Son 6737 Chicago 60 (()



LAMINATING

This rettartable Princip Lauring ton Min the e. I may directly the of an house principal like profits in house himself of a feether than an experience of the entire of a line of the principal o

DRAIN WASH TUBS CELLARS, CISTERNS. Formous #7 pumps 2000. GPN 420 GPH at 75 high or 2500 GPH from 25' melt. Sturdy, rustproof Alley Metal Six Blade empellet. Uses any 1/6 to 1/4 H P Motor Will not look or clog. Fits any garden hose. Immediate money back preventer Send Check, Money 1895 Order or C.O.D. Order & COD.

IRRIGATE FILL TANKS, DRAW WELL WATER Heavy duty all Powers 7000 GPH. 1000 GPH 75' high - 3000 GPH from 75' well. Rustproof Alloy Metal. Il trade impelies. [" inlet --]." outlet. Standard Pipe Turneded, Money back guarantee, Send check, \$1195

Free Catalogue — Gear Pumps — Deep and Shallon Well Pumps

MOORE MANUFACTURING CO. SWIDISTORD IS NEW SERSET

veni

The following are the usual preliminary steps to take toward patent protection.

Make a disclosure of your invention; sign, date and have this document witnessed by two or more people who understand your invention; authorize your registered patent attorney or agent to conduct a preliminary search among previously granted U.S. patents for similar types of invention, secure a report on the probable patentability of your invention and a recommendation of the further course to take.

We shall be glad to send you without obligation our instructive hooklet, "Petent Protection for Inventors" and our "Evidence of Invention" discluture form.

MERLIN BUILDING, WASHINGTON 6, D. C. 940.K

IF YOU WISH TO PROTECT YOUR INVEN-TION, You should take steps to protect it by a U. S. Palent. Write me for "INVENTION RECORD" FORM

PATENT ATTORN

WOOLWORTH BLDG., 35th FLOOR, 74C NEW YORK CITY

Whether an invention is patentable can be substantially de-termined by a search of the U.S. Parent records. Without obligation, weits for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH

Registered Patent Attorney

205 Columbian Building

Washington 1, D. C.



426 SHEW BOLLDING. WASHINGTON T. B. C.

PATENT INFORMATION MVENTOR'S RECORD without obligation

GUSTAVE MILLER 74-PS WARNER SUILDING WASHINGTON 4, D.C. REGISTERED PATENT ATTORNEY

ASSOCIATE EXAMINER U S. PAT, DFF, 1022-1939

Patent Attorney & Advisor D S. NAVY DEPT 1930-1947 PATENT LAWYER

INVENTIONS

If you want to market or sell your insens on for each or coynilles, Write for our Free Spaking, Send no diswings. We good we come he e ng from titme, ng presaye expital, w string a enview insentions in any used. We will be glad to send notice of our clients' inventions

GLOBAL MARKETING SERVICE

1404 Mitchell Street

Dept. BO

Dekland I. Calif.

When Writing to Advertisers. Please Mention Popular Science

I shall be pleased to furnish you, upon request, with information relative to patent procedure—without any obligation on your part.

PATRICK D. BEAVERS

Registered Patent Attorney

937 Columbian Building, Washington 1, D. C.

LEARN MEAT CUTTING AT NATIONAL Pay After Graduation



The steady dependable trade of Mear Cutting taught easily in 8 short weeks. You LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a Profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, sell-ing, etc. A complete retail meat education. National School established over 30 years. Get National training NOW. Pay your tuition in easy weekly payments after you graduate. Get all the facts. Send coupon for FREE 52 page school catalog-TODAY, G.f. Approved.

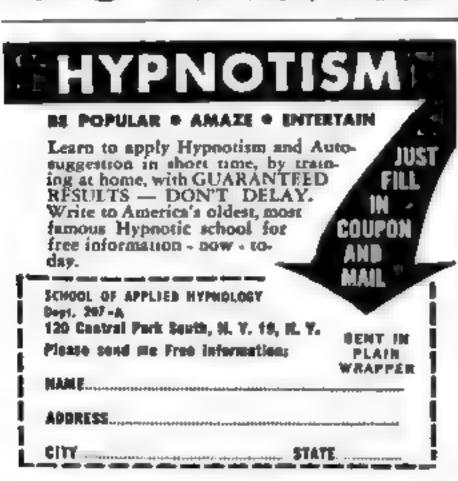
Mation Dept. 6	4] 1-4	Scho I. Yel	el et edo 4.	Most C	atting,	lenc.	
Toledo	lit.	Ment	Cuth	Louis Me) entwing put Merch Hebinus Y	sendleans an	a) Training at id Solf Service
Name	+ =						A80
Address							
City .		AP	erred			. State Fran Velera	MA - 2 + 0 + 2 + 2 + 4 + 4

BUILD LUGGAGE AT HOME **WE SELL YOUR PRODUCTS!**

Only New Home Money-Making Plan in Years!

Wake Luggage and cases for traveling, photographers, musicians, salesmen, electronist, icols, partiables, 2001 other items, Aleo report Luggage. No special sequement seeded, BIG Prafile. We supply complete instructions—everything. Write for Irea details and Business Floa ABARRI CASECRAFT Dept. H-7, 805 W Supplet Bird., Lob Angelon 12, Calif

W	OOD HAND" HELPS YOU SUCCEED!
1120	LEADA
Office	LEARN TO WRITE WELL
977	Handwriting quickly improves with our easy-to-
Clame	Buderstand Bicinte leavant bat that byure fitte
how thinkly	"How to decome a Good Perman," or Check
griffen, plus tpecial pen-	We ling a Artistic Writing a Card West on
point for	■ Bird & Design Flourishing Cagressing
shaded OVE	Asphabets, COMPLETE BET 54 80, Ash but price list of permant's supplies.
derittig, Saed	TAMBLYN SCHOOL of PERMANSHIP
Circly 100	S. A. Eiffer, Proc. 432 things Wide, Source City, Ma., MA.



RADIO-TRAIN IN 10 MONTHS OR LESS

Prepare so space but to for good pay in Teletiston Builto and E retroples Train at home
with Frank L. Spreaderry America's outstanding Radio Instructor Blig Kits of Equipmens for subset B and feature and the
limit name and address for dotal b and 2
Blig Ralphi Rooks All FREE No
sacratury Academy of Radio, Dept 55-1,
111 R. Const. Chicago 5, 1966 a





har care have old or roung the care have old or rounce you are no case astempted of your creams (the case selected of your creams (the day) and fill earth of the your old the profit of the your old the profit of the your old the profit of the care the profit of the care that a form attemption your obtained by your who is muscular opation. In the profit is not been also profit is not the grip that your been and profit is not been profit or the grip that a care the grip to the grip that a care that tall of streets and

the page friends will be amaged! White for fuel BOOK 32 pages also as how "Dynamic Transies" characted ma from D7 b. weaking late. World's Most Perfect y two logged Mari "- and what E i prove it an do for You. CHARLES ATLES, Dept. 10, 115 C. 23rd Street, New York 10, How York, ful of strength red-blanded visal

CHARLES ATLAS. Dept. 10.

148 East 33rd St. New York 10. N. T
South me show stry \$75rt a copy of your (amous book. 'Ever asting Health and Strength.' 12
tages or moved with photon and valuable advice No obligerion.

One at Charles Atlas

pupils ... win-

Championship

(Please print or write plainty) Address.

City __5tate__

EYE GLASSES AV

WRITE for FREE CATALOG with 14 LENS SAMPLE CARD Thousands of

Customers Fe 1939



QUALITY READING-MAGNIFTING OR BIFOCAL CLASSES FOR FAR AND HEAR ADVANCE SPECTACLE COMPANY. Inc. 537 S. Dearbarn St., Dept 1827 Chicago S. Illinois

more jobs than graduates

tociuding a complete Demand for our engineering grod value exceeds supply Effective placement! Study in this world-lamed carlege. sestablished 1884. New term storts quar

lerly Approved for Koreon Vets.

Bach, Sc. degree in 27 months

Hackeyer of detence a Mechanical, Civil, Liestifical, Chemical, Acres at a Hackey Television) Administrative Engineering Bur to bim a stration and Accounting Acres (6) weathe certificate with the the transfer of the Secretaria Science, Intensite pro-

store pars hat and notrue on For earnest, mature students where this and budget require accelerated rourses and model costs.

Cremaratory daspress

O. and he campus in friendly recipre form Well-squieped, haw and moderated by blings and later Enter Sept Jan. March June it is John it earthy Entertor of Admissions for Catalog and Tiest Study.

974 College Avenue



RAISE CHINCHILLAS AKE MONEY AT HOME

TOU BAISE THEM—WE BUT THEM!

Small capital can show terrific profits in your spare time! Free booklet explains our new lease plan. Write Dept. 602

CHINCHILLA BREEDERS CORP, .. 246-02 HORTHERN BLVD., LITTLE MICK, M.Y.



DRAW The First Day!

NO LESSONS! NO PALENT!

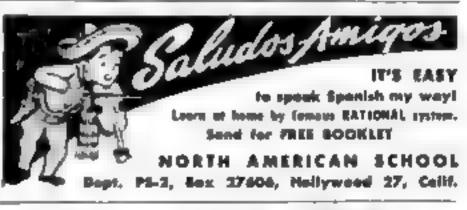
New American Liverspan-" Marie Art Resembleds."

You can draw Your Varily Frieding, Admining From Rick Lift.—Like An Arthit Yven If You Can't Dillaw A Kindight Line! Any high you want to draw as an intentionary seen on how sheet of imper him the Magne Art Reproducery "They want to draw the lines of the 'cite ira inque with a lone of the 'cite ira inque with a lone of the 'cite ira inque with a lone for an effect of producer inquition draw light A so becomes at enlarges NFO23 NI MONEY Free In they from produce at enlarges NFO23 NI MONEY Free In they have see bones Each (thurstate).

PRODUCTS. HORTON PRODUCTS, Bops, 4407M, 294 Broadway, N.Y.C.

LIFE BATTERY OFFERS REMARKABLE MONEY-BACK BUSINESS OPPORTUNITY

If you qualify as distributor in exclusive area, you can earn \$800 per month and more. This is a multi-million dollar business, permanent and sound Some investment for merchandise required, but your success is assured in 60 days or investment returned. Address Life BATTERY CORP., 12909 Venice Scolevard, Venice 4, Calif





ILLUSTRATED

Men, here are the small illustrated cartoon booklets of comic characters they're talking about, 20, all different, tand other offers) sent for \$1 postpaid. No C.Q.D.

GAY SALES, 446-L N, Prior, St. Paul, Minn.



631-PS LINDEN AVE., BUFFALO 16, N.

PLASTIC LAMINATING AT HOM

-de work in SPARE TIME at home -or expand into FULL TIME has Bend coupon for Free facts about the newest and most fascinating of all home operated humneson For the first time a simplified machine brings the fabulous profits of Plactic Society and Plastic Laminoting within the reach of the small operator. Any-one can learn to operate the machine with a few minutes practice. then with our Magte Mail Francas get mularders pauring in daily with cash in every envelope. He convessing ne selling. We seen

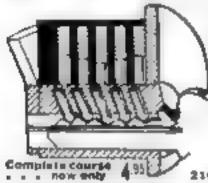
supply the elections you mail to bring back cash and order Don't wrate a minute Rush your name. We I send you FREE and postpaid, pictures, prices, details, and all the facts you need to start. Mail coupon or send name on postcard. No charge. Warner Electric Co., 1512 Jarots Ave., Dept. L-II-L, Chicago 26, illinois.

Make Thousands of Beautiful Art Creations . CANDLESTICKS . COASTERS

LAMP BASES . BOOK ENDS...ALL IN SPARKLING COLORED PLASTIC



WARNER ELECTRIC CO., 1512 Jarvin Av. Dept. L-9-I Chicago 26, III. At no post to me, please rush complete cetalls postage prepaid, I am noder no obligation. Address LOW4_ Abride.



MAN

Jub

to taking out of

the machine a Plastic Scaling,

back \$2 58 to cash by mail Caracity of machine: \$25,00

profit per hour of equenties,

ordered by man - only te in mater al cost brings

Locksmithing MARING Now Made Easy Practicat up-be-

laurbes you have to pick forks de code, make blaster here repair tastel seer or fundament on several for refer hand prize in severe for every hand prize hoter for a cuter for the statem meriator for a cuter for the first hand to the first says to deliver and letters to the first says to deliver and letters and a first says to the social statement of the policy policy or the first says or refused statements and the same says t

Melson Hall Co., Dept. QW L 1 Gunion St . Chicago S. fil.

ALL VETERANS DISCHARGED BEFORE AUGUST 20, 1952 must be enrolled and IN TRAINING by August 20, 1954 or lose G I rights to a free education under NEW G L bill. We from you at home to become a trained TV Technician-good pay and a bright future in TV! Time is short Send for 4 FREE AIDS and details! (Non-veterans too!)

MADIO-TELEVISION TRAINING ASSOCIATION, Dept. P-78 52 F 19th St., New York 3, N. Y

ADORESS & MAIL PÓSTCARDS AT HOME bを促む BOX 9, WATERTOWN, MASS

if omployed, start part time Alert dealers ean gross \$3 hourly profit on own service pour \$3 on hat if serel cause these revive, much proof rogs & uphale ery on fore ton. No such heeded Bervices untionedly adver hed. Repeat ristabites. Lany to learn. We locally train and pariet you Quickly established hany letter. We stend today for Fittis booklet. No obligation.

DURACLEAN CD., 4-187 Derocloso Bidg., Deerfield, III.

GOV T. JOBS! AS HIGH AS \$4205.00 YEAR TO Men, women, 18-55. Common education often sufficient Write immediately for FREE 36-PAGE BOOK with Int of positions, salaries, sample tests and full particulars Not Gov t. Controlled) telong how to qualify for them. Franklin Institute, Dept. P-80, Bochester 4, N. Y.

FOR

M designal Franch and Are Your Prospectal Ress reaction ap-

pileners for Irienda and neighbors Specie of the approximate to store of Earn up in 1 OF \$4.00 an house or more New above method home analy to bits the truste X r tracks of too passific a first home to \$7.50 thank, and Specie PAY 1.1711 form CHRISTY TRADES SCHOOL 4804 M. Rednis Ave., Dept. D-4101 Chicago 25.

To Success In Says: Phil DeCapito, Engineering Draftsman



"I wanted to get in an the big money and success that industry is offering angineer ing draftsmen. I m sure glad that I look that first step and sent in the C E I covpon. Becoming a draftsman was a cinch with CEI Training and coaching. And, if I could do it, so can YOU! Send for the Success Book today "



Get This Professional Set at NO Extra Cost!

SUCCESS BOOK

I Cleveland Engineering Institute Extension Division #5-7-0 6300 Euclid Ave., Cleveland 3, Ohio) Mechanical [] Aeronautical [NAME

ADDRESS

CITY STATE No Obligation - - No Solesmen

CLASSIFIED

OPPORTUNITIES

Here are hundreds of opportunities offered especially to the readers of Popular Science Monthly. Read them. Answer them! You can make and save money.



POPULAR SCIENCE MONTHLY - 353 FOURTH AVE. - NEW YORK CITY 10

Classified Adv only 90s per word per imarties, payable in advance, Minimum ad 10 words. To be included in September Issue, cary should be in our office by July 23. He concelledions accepted after July 15th. Address orders to O. K. Kelly. Classified Adv. Mgr.

AUTOMOBILES & MURIET CARS

HI M lease Speed Equipment from the World's Largest Supplier Dual manif da fit ned heads, electric duors, luwering sets. fuel savers thousands of items for a learn Huge cataling 25c cliquetra ed Literature free Wholesa e to garages Newhouse Automotive industries Los Angeles 22

MODEL T Pords and parts Catalog

PIBERGLAS agramobile bidge 5 4 d your own Everything needed Lowest prices Information materials calants loc Gem O 1 its Box 6868A Worth Hudywood Ca Hornia

200 MILES galon average car make your own parbureror Comp ste pa ent deta to plus suggestions 29 page book et \$2. Behing Suk 855 Dept. 2A logicwood. Cas formia

WRITE for free sample copy Praneon's Motor News, Eugene Oregon

NON-Profit organization offers automo-NON-Pront organization and fore un, bile literature—old, new and fore un, dealer books service manuals glossy phutographe free motor magazines. Write foday get on free ma g list. Auto Manieca Stockbeidge Michigan

LROSLEY parts-price stat. \$1.00. Parts book \$2.00 Service Manual, \$5.00. Ms in other benefits W. ts Creek Car Owner a Club 2:01 Greenway Cha wite 4 N

ANTIQUE Auto Prints—Beautiful four-color water polor type reproductions for framing bigies on heavy stock Olda. Stanley Steamer Maxwell first Model A Poid Set of four \$3.50 postpaid. Indo-craft Dept PT 4760 Arlington, Fort Wayne Indiana

MILKIET Auto p.uns \$1.25 buy out parts. Smyers, 1141 Kloo, Macanee, Ohio.

CHORLEY Parts new List 5, 00 (20-

ACTO SUPPLIES & EQUIPMENT

BRUSH Plating Outfile connect to & buttery No tanks or shop required Pres-particulars Gunmetal Co. Ave. E. De-Cd a. an ciula

1954 EDITION It . New! It a Different! Get world a largest Auto Accessory & Parts Catalog and nove money 132 pages Over 50 000 prems including Hodgwood Accessuries H. Speed Equipment Rebuilt Eng nes al, parts and accessories for all cars and trucks We have that Hard-To Get part! Jam packed with bargains Com-Dietaly a uncrated Send 36c refundabie) C Wh they 1919-Ell Archer Chicago 16 1/1/2-016

*AUTOMOSILE Accessories for Pres-ta * W* to Neber Industries, LaVerno

NEW And Used Parts At Savings Complets guaranteed parts service for all mosthis cars and trucks late or old Largest in the West Army puris speciatate No ratning write for quotations Past Mail Order Service. Planeer Auto and Truck Parts Co., 788 W 13th Avenue, Denvey,

SAVE your life with amuzing new Torston-Plex Sway-H. iters Stops sway Hierature sift offer Eway-Billiner 1434-B

PORD T Paris Engine and chessis, Parts for other old models Special parts made to order E. S. Washiewski, Milwad-kee T W. wohsin

SILVER Points best for smooth motor. speed and power Custom made Write Scientific Electric Co., Box 2143-RE,

SPEED equipment any cut write Power, EFF West 117th Hawthorne California.

RADIOS dustont for 1857-3-4. Fords all Evacaton I shoth

LACHAPELLE B patented Treatment. Was make your motor but or Pres data. Perns Products 2130 D Washet Dr. Les Ange en 1 Ca at

EVANS Heads man folds engines built free . terature 2530 No Beaman El Monte. Ca fatas

AIR Condition Your Car Send \$3 96.

CROSLEY parts, New Deed, Rebuilt transmissions Shift covers No last tell me your needs Genes 1915 Se M Port Sm) h Aftannes

IDENT O Tape! Personaited Scotchtrurds dupter ted rangers micknames ad-340 Pirth Avenue New York 18

CONVERTIBLE Tops 679 50 Workmanship and fit guaranteed. Past view wandow, botseshoe upper maching the torks step by step matrocrans 1941 to current models. Tan Bark Match is pads 6' 10.

Prort wooden by we Ford Mercury \$12.20. Head in ga \$17.05 Taupe Orey instruc-Broop 001 E Huy Midiand Teast

SAPETY Bests Green Sine Marcont Over Hardware Instructions Inc. uded. 94 95 Bux 1282 Pougi keepese New York

RYDRAMATIC Owners prior to Manual and an added control available status to Due Range Select third speed at 9 31 Hall 95 Nicition Third Speed Selectors, 1489 Lan Augeren 21 Curd

SENSATIONAL Pres Trial Offers' Burplus stork of famous Cale Hall automotive natruments brand new origins, restonat Try at our risk for seven days then send payment of return merchandian' Profesaional Compression Tes era originally \$10.76 now \$2.00 Combination Vacuum Clauge Puel Pump Tester originally \$6.10 how only \$2.00 Original Cale Hall motor condition quasiting scuriomy gauges for permanent dashboard mounting originally \$7.50 to \$62.50 (Desure all chrome custom foreign model originally \$10.05 now only \$4.50 > (Add 60c to each price for postings (Order Now New England Surplus Said Dept PS-7 Newburgpart Mass.

CROSLEY Parts Supplier Hydradian Brake Parte Marine Conversions. Service. But I Emont New York

DO you know how to buy a used par? Dela le \$1 00 Cluaranteré lo tovo you money John Beety 124-A Scenic Way, Van Plo Caul

FELT back floor mate (seconds) to fit cars before 1941 only 22 19 pos paid San-dy Seise 227 W Washington Street, Sandusky Ohio

500 000 AUTO-Owners Can't Be Wrong. Puncture proof your tirm in 5 minutes. Stope worry Trouble Danger Write Spanden 413-8 Portland, Sochester New York

BUY Wholesale nationally advertised auto supr les thousands o'her products at big discount Free Wholesale Flan " American Buyers' 620-EE, Linden, Buf-

INCREASE! Describe tribungs Three to Pive more miles per gaulon Guaranteed Gasoline Vaporteer also increases Power Easter starting \$1 M. Turb-O-Vane, Stockton Cauli

CAR Burning off' Losing compression? Try Chifford's Compression Seal \$2 post-paid Clifford's Engineering 1320 Seventh

RAELITE Pistons any make or model Comp ete Platon Service Uprand Ca li

CUSTOM Accessories Headquarters New doftimet catalog Just out complete ever jam packed with Jirms not to stores. New Law Pices. 35c Eastern Aulo 31,8PSC South Grand Los An-

El ECTRIPLATE autoparta noveltica. Billera Lasy theapers to home processes Pres orobjet Tyro Metala, Box 12311-PC Houston in Texas

MOTORIST Bave Classing by Varumailing overrich mintures Fits on care. For free particulars write Vacuthatie, Dept. 3078. Wauwatosa, Wisconsin.

(AUTOMATIC Packet) Make pourself Attached to rear and for car trucks. Spec Scattons 500 co n John Schafer 27 Diseman Street Brooklyn 31 New York

END out changing: Refine your oil as fou drive Refinol antiquates all other off Sixers Pres houlest on anting your ter of tractor motor in ernations. Refinal Com-party 1041 W 67th Brookfield, Illinois. Chicago a Technical Suburb

CADILLAC, Buick Olds Pontine owninities you're wasting gasoline. Restore your distributor a th the genuine Spark-O Liner and new breaker plate for I is the cost \$1.50 each get one hew from your automotive electric supply company ree literature. Hove 5000 Clinton, Manneapolis 19 Minnesota

MEW Auto-Guard stops thief. Better than insurance. Watches our day and night, Conranteed New, try it on own car plan Write Besentific Electric Co. Box 2:42 BA Centra 16 6 Ohio

L MRET IEVABLE Row ION 20 Scientiffeatry circus radia ora rike new Safe to use for months Combat overheating Pres lit-3350 Madison Cinciphali 9 Ohio

AMAZINO waitage power regulators. Stop generator regulator and battery trouble There is no better regulator for cars and trucks Guaranteed New try it on own car plan Write Scientific Electric Co. Box 3143 BC Cleveland I Ohio

OVER 200 mises per gallon Gas Your est raims foreblor free information. Oane Sconomy Club 3664 Wmt Pion Dupt. PS-1 Los Angeles 35 Cant

BUY wholesale direct Name brand Auto Supplies 19 800 other dema Free Wholepare ldes National Buyers Bervios. 12.1FD Capitol Houston, Iraas.

AUTO TRAILERS

BUILD your own trailer! Plans for all kinds, lilustrated catalog life. Jun Dandy, 125-6 Wausau, Wiscontin

ASSEMBLE Yourself, Trailer Eits, Pickup Coach Elt. Biueprints, Literature 10c. Comstock Trailers, 565-5K Parsons Kan.

TRAILER parts catalog largest in mid-west Send 20c Hanna Trailer Supply, 615 West Layton Margather Wasconsin.

MOTORCYCLES, BICYCLES AND SUPPLIES

RECONDITIONED motorcycles and motors. Chromium accessories, Complete stock India's parts Espert rebuilding Past service Indian Motorepole Saies, Kannas City 27 Mo.

SIDEWALE automobile \$25 00 Cushman Whiteer motorbike. motorscooter \$75 00 \$25 00 1954 motorscooter \$40 00 Rush 25c (15c first class mail) for new ratalog #956 listing many other amazing bargains in motors midget cars molorscoolers motorscoolers motorscoolers motorscoolers construction plans. Associated, Shiff's motorwheel \$15 hinying twin being no \$5 Garden tractor \$15 Check motorcycle \$35 Bervieyele \$35 (Mallorder only) Bend 25c for Directory number 60 just out liming these and hundreds of other barral is in new and hundreds of other barral is in new and hand midget cars motorconters and one parts plans for hotorbullders at 125c by first class mail hidget Motors Directory Alberta, Ohio

MOTORBIKES, Gasoline engines, Catalogue 10c. Loren, Box 436, Danville, III.

REBUILT gasoline engines \$17.00 to \$37.06 Caumel Motor Industries. Temper-ance. Michagen

AVIATION

BUILD a Helicopter Jet Engine Yourself! 'Practi ni Ram Jet Design' - \$1 to Decker Engine Works, Plantereo, Virginia

BOHNLE Sextant Airforce surplus \$18.75 plus 80c hand ing Parber Products 236P Laterette Sures New York 12 N Y

OWN, operate airplane for profit. No Capital, Plan \$1.00. Gustomaire, Bux 15. Vandatia Ohio.

PROPELLENS plane hits for air hosts, show swight immediate delivery Calaing 25c. Banks-blaxwell Box 35610 Ft. Worth. Texas

GENERATORS, ETC.

EDIMON Nickel adorses starage butteries at to 600 amijere hour Ady voltage bold dustance I iterature Hawley Smith Co Cruto, Paul 2 New York

7 BLECTHICAL SUPPLIES A EQUIPMENT

LAMPS 35c brings bargain catalog showing all parts for repairing building Cortains instructions for electrics of vasos, oil lamps, etc. Gyro Lamps, 54623. Cark Chicago 40

PIRE As m Systems. Complete Instail pourself Bomes Surers Bomes AAR Fire A arm Bys ema Bux 23: A Conseque N Y

WEI DING, SOLDERING

BUILD-Ut-Own an wester and ar power plant with a good used engine and low cost Robert generator Wester a y where and supplies SKW stand by power for a y end gener Write Robertward, Box P 743 True Obio

ELECTROPLATING Kits Tanks, Supplies, Capital, 4217-8 Queensbury Road, Hystlan, et, Many and

MACHINERY TOOL SUPPLIES, ETC

ALLEN One Ton Power Bench Type Punch Press, 201.50. Circular, Allen, Dept. PSB, Clatton, Missouri,

SENSATIONAL New All Steel Wood Working Lathe, 5" Swing, 12" Centers, 94 95 prepaid, Free circular Sypher Co., 1.0 Cherry Street, Tuledo, Ohio.

BARGAINS in surplus tools, equipment sudgets, Send for bulletin 130 Trinity Supply, 4427 Kelton Davias, Texas.

10 ENGINES, MOTORS, ETC.

WINDING Date, listing 225 motors, single a d three phase, \$1.00. Motor Date, Box all harbes Cry 48 M

ALIERNATING Current Cenerators 750 watt 838 50, 5000 8185 00, Motors & horse 637 50 2 887 50, 3 387 50 Equier 1805 Mil-wankee. Chicago 47

HUBUILT Cascilna Engines \$17.00 to \$37.00, Casmel Motor Industries, Tempe, ance, Michigan

IL BOATS, OF THOARD MOTORS

NEW used rebuilt marking motors Marice codescription hillings. From tests of Stokes Marine Bupper Dept. 22 Coulwater Mich.

OUTBOARD M for Parts New Used for all makes. Send stamp for price quotation. listing parts needed Outboard Motor Mark Inc., 2200 State Street, Boston, Makangusetts

Fig. 1 and cul-to-shape Boat Pattert a Brace tier a France cet. New 1936 must trained Build & Boat cet. New 1936 must trained Build & Boat cet. New 1936 must trained build & Boat cet. New 1936 must aret upot des greed Crusers Ruman out Many ps. Ne da Opin 10 Boat 12 g. Ruman out Many ps. Ne da Opin 10 Boat 12 g. Ruman Gatarog \$1.50 Bugger butter 1954 How to Build Boats book \$2.50 Putywog Houseboat Plans \$12 Cleveland Boat Bi apr 11 Oo Dept A-77 \$400 Sectionary Cleve and 6 Otho

SAVE dought when you buy used inboard or outboard motors. All kinds boat prope, ers and supplies. 25c brings complete data. Masters, 212 W. Chicago Avenue. Chicago 18. Illinois.

Contenue Kits Pederal Matine Motors. 101. Collage Grove Ave. Chicago 19 111

MARINE conversions for Pord and Josephora Calledge 10c Lehman Matlufacting Co. 871A Broad Mt. Newark 2 N J

FREE Catalog Boat Kita, Transers Piberglas, Marine Hardware, Luger Industries Dept MD 1201 Fremont South, Minneapolis, Minnesota,

BEA Legs Boat Etts, prices from \$38.00 Complete kits, including brass wood screws precut parts pre-assembled frames luoiproof illustrated instructions. Write for Pres interature Pennsy Woodcraft Industries. Dept. C.34. Defiance. Ohio

FIRER HAS permanent heat oneing Everything needed Lawest prices Compile a catalog—let Gem O Lite Mon Metalia North Hollywood Caldernia

20 FOOT sading catamaran plans and patterla free Literature Widd Hauber 245, 18th Avenue, No. St. Petersburg, Pla.

BUILD Beautiful fiberglas-plastic boats without using molds. New patented method, Write Speedcraft, 3450 Emerson, off Square Lake Road, Pontiac, Michigan

BL's Wholesale machinally advertised cultivards thousands of 81 products at big discount from Wisocesale P an American Buyers \$10-KK, Luiden Buffalo 16 h Y

MANUALT 2 H P Inboard Motors \$17 co to \$42 00 Caudiel Engine Co., Temperance Michigan.

AIR bost plans hits supplies Catalog 25c Banks-Makwell, Box 3301J Pt. Worth, Texas.

LIPEOARD file preserver puts galety right at your ingertipe indicte instancy with a quick squeece Processyou as earlier hand a light, compact or first lates. Fasters to helt or ciothing Reloads in a just two terridges \$6.50 Entra cartridges \$600. Compact your postpane. Litterard Sales. Not 3757 Denver

PIREROLAS—litetime boat coverings—building materials—compare our prices. Free information, 12h page it ustrated Auto. Boat Furniture construction manual—see postpaid, Northwest Pibr-O.ass Company 1-11 North Morgan Minneapolis 11, Minneapo

11 MODY-BUILDING COURSES, 11U JITSU & ATRLETIC EQUIPMENT

PERFORM Thruling Strong Man Stunts First to attack new Landowsk 10c Acad dan Book Co., 210-ST Fifth Ave. New York 10

BODYBUILDING course, \$1 00. Jurry Stracock 6.5 Morgen Avenue Brooklyn 22. New York

12 MUSCLE Courses \$2.00 Results guara- and Sid's System, PS Southgate. Calif

HARBITLE Dombte a Eure se equipment Courses Free scullet Good Barbr Co is ading Persia

FIFTD 61 ASSES, TFI ESCOPES

PREE Catalogue I housands war surplot of ical ba gains Les set Priates Telescopes, Binoculars, etc. Send \$2.00 for 10 Lens Hobbyist Set and Project bookies. O. Jacques, 601 West Marrick Road, Lynbrook . aw York

BAYE 25 | Get Interesting facts Free 22 page B) ocular Transmise Catalog 81 85 0 8750 00° United 9041 8 Western A 50.4 Criticago 20 Design Wanted

and the LRS attaches prices bringly lars maintenance gunscopes processes free trial builder. British and of free has Importera Recently Bids. West Los Angeles In Carif.

ARAND new 7250 B ocusers etd center sociating (Reg \$100 to Our price direct I om importer \$40 00 Ten day trial Satisharitoti guntableed or money back Free bargain catalogue Dealer's Mart \$4 Bevery Road New Rocheste M Y

REFLECTOR Telescope Kits from \$4.25
All parts designed and built a our Hoboken factory Mis or Cella Diagonals Focusing Months Tripoda Tubing Occurra
Fing guaranteed Free Elustra ed estatog
Easy time payments and by away plan
available Send orders and inquiries to
Esco Products Dept. PS-2, 1420 Willow
Avenue, Hoboken, New Jersey

TELESCOPES, Microscopes, Binoculars for quarter century. Big bargain scientific catalog loc. Harry Ross, 10 West Broadway New York 7, M Y

DYNASCOPE—New Sensational Reflector Telescope 65X 130X 167X 4 power Finder July achromatic, 5 foot Tripod complete ready for use Bend for Details Criterion Mig Hartford Conn. Dept D63. WAR Surptus Bergelius! Millions of letters in ruments to recopes by sculars components. World's greatest optics, market place. Band only 8, 30 for begin er a 10-Lens. Est & big Instruction Rock et Stock CN Write for Catalog UN Prec. Ed mund Scientific Corp., Bartington N. J.

RFFLECTING Telescopes completely assembled 50X \$73 is Districted Observatory clearness Prec Information. Structure 475 Fit h Avenue New York 17 REFLECTOR telescope mirrors. Write L. Hauderon, 4807 So. 7th. Tueson Aria

SPECIALISTS, Used, new microscopes Prepared slides, Supplies, Telescopes, Free | Cities ed catalier Vassau Opical # W Gree with R overest New Y 7k

B. SciCULARS Te escapes Microscopes. Terrific values \$3.90 up. Request Free-Money saving catalog. Oriterion, Bartford, Conn. Dept. 825.

IMPORTER S Special 7235 IF Stoorgiar \$26.66 6236 IF H normal \$19.30 with case each 160 700-300 power microscope \$0.25 postput tax included guaranteed Jo-Jon 1825 Atlantic Avenue. Long Beach. Cauli

SPACE Rover Astronomical Telescopes. Precision made. Professionally equipped Rasmussen-Resce, Amsterdam New York

GIANT 100% day and night telescope Steel and brain tube construction. Compete with extra heavy traped two erepasors and because of 1/2 00 and 1/6 00 Free in ormation. 400% fractions that the or free in area from the brain focus of tube erector 5 senses instructions—31 15 Suffect Science Riverhead 4. New York

LOWKST prices all sizes Bidoculars Te recopes Mic alcapes \$4.10 \$32.00 free catalogue Jura Billiona at 46 on 4627 Secord Street Detro t L Mar gan

FIRMING TACKLE, ANCHERY, TRAFFING

180 PROPUSELY Illustrated pages, antique pastola, awords, daggers armor etc. Soc. Robert Abels, Pages Lexington ave. New York 21

CAST from Binker Maids for making your own as kers Free Basatrated bookiet Reading Instrument Co., Box 75 Reading Per tayers as

Per topics a

JAP and Mauser Military gums make five high street with modernized with a Pajen 85% Sinished American Walnut Sporter strict stock for it yourself in only a few house of spare time Save money we furn ab all necessary material and out pie e easy to be on a structural or y 115 75 Fajen 115 PS Watsaw Masouri

PISHERMEN Attention! New! Amazing! Action! Lure \$1.00. Postpatel Revision, 2720 Gravate St. Louis 18 Missouri

MOI Dit for Fisherman a Strikers Jigs Squids, Casting and Spinning Luies Free Catalogue, Sweet & Molds, Tonawanda 3, New York

war of the Albert suc sin the Masseum R of the N J

No W mechanica book padding desire Not a securet base F det Ou ovard lad die Do 2516 Springbio Avenue Mobile 17 Alabama

DIV NG Lung Compressor Make your own We's Sewart to b Greenwood Ave-

IMPORTED Daters of settor Throwing Pocket Hun of kr ten etc Free catalog J D Claston 14 Church Mt Creme at 3 Mich

BUY Wholesale nationally advertised eporting goods, thousands other products at big discount. Pres "Wholesale Plan. American Buyers, \$27-KE Linden Buffale 16, M. Y

JAP tifles attering American shells 96 00, catalog Sc. TP Shop. West Branch 10, Michigan

BAVE 50 ** on finest bows, arrows, comple a be whanting outlite etc. Free Cataing and How to Hunt with Bow and Arrow booket Send 35c for handling Mainbu Archery 1,55-C 8th Street Los Angeles 5 Calloring

CARTRIDGES \$12.00-100 your cases any camber castom loaded. Firearms 1517 Gardner Ho. 1 wood 48 Castotom

SWIMMERS! Send 43 65 for Imported Prench Mask Skin Divers' Catalog 25c Aquatum, Davenport 5, Iowa

CAMPING EQUIPMENT

All Mattresses inflated quickly Engly Plugs into cigar lighter Write Air Pel Company Dept. 7. Box 224. Bothell, Washington.

CAMPING equipment touts (direct from manufacturer) sceping bags, air mat-treases. Low prices Send 10c for 73 page illustrated tent camping equipment tent maintenance catalogue Mor San Bases 10-11t; 30th Avenue Long Island City 1

DOGS, BIRDS, HAMSTERS, RABBITS & PATS

MAKE Big Money! Raise Chinchilla Raids. Cash Markets Supplied. Write day Bock/Lil Runch Bellersville 16. Pa.

RAISE moneymaku g Angorn Sew Zen land Rabbits Particulars from Rabbitry Jackson Michigan

CHINCHILLAS (no rabbat, ranky raised Profitable Big future Terms Chiff of Chinchilas, I hack Michigan

HAMRTERS—solden, young \$4.00 pair fully developed \$5.00 pair Adirondack Hamslery Prospect 27 New York.

MONKEYS Their Training Care and Poeding new broklet describing 30 must popular varieties. 25s postpard includes importers price list, Tropical Hobbs and 1532 NW 27th Ave. Miami, Florida

HAMBOO bird cages & ngle root \$3 85 Double roof \$5 \$5 Heang the style \$6 \$5 postpard Jo Jon 1825 Atlantic Avenue Lang Beach Call

QUINEA PHE Cash bearing Bookest free Taylora B4268 Hapeville Georgia

MONREYS described abundants and types makes etc Huntrated ca some The Train End Zon-4. St Stephen. South Carvitna

GROW Mushrooms. Cellar shed and matdoors. Spare full time year round. We pay \$3.50 in We payd Habbis \$4.162.00 in few weeks. Free Book. Washington Mushroom Ind., Dept. 177, 2854 Admiral Way Beautic. Washington

MAMNTERS—Golden, Grown, \$4.00 pr Young \$2.50 pr Free information on Al-binse Circle S Hamstery Box 185, Claymoth, Drawaft

ALBINO Hamster young breeder 15 a 11 eq Akron 7 Ohm

FARMS, OTHER REAL ESTATE

PARM Ranch Opportunities Pavorable cot data or Washington Michiganeta Mich tale Ideno O teor North Lak la erature faith descript in Species which No Bt Paul I Minn

CALIFORNIA Ranch Lands 50c to \$5 acre minimum bid Parm-ranch-hunt-- review 10c brings litustrated land care a cating maps. Tax Land Sales, B. s. cooks. Hollywood 20 Calif.

STRIOUT Resity Catalog Malled Prest Parms Momes, Businesses, 34 States Coast to-Coast, 3240 barmains Seser bed Winds Largest 54 years Service Strout Ready 255 ZB 4th Ave New York 10 N Y

JOIN the Money Makers in Houston-America's Pastest Orowing City. Business Business Business Business Many Industress heeding thore In a rees. Fur him Prices get rost thorew Moneste in pour ar new Add tion. Or ly \$142 are terms Information Free Nathan World Box 611 Houston Texas.

VILLAGE Homes, gardens like rest hat free, Perry Bret ... Penris

POLLIER & SUPPLIES 21

FREE bookiet. Opportunities, Unimited Raising Waterfowl! Sullay Creek Paris Red Lake Fact Muclemota

22 PROFUTABLE DECUPATIONS

DETECTIVES Earn By Money, Excelopportunity Detective Particulars free. Write Wagoner P-125 W 16th, N Y 24

BOW to Make Money With Home thabing describes american merhida Wurkship used by hundreds of successful craftsmen. Tells what to make H w to se ! workshop output spare time. Write at pice for details Craftsman 115B? Worth Bt

610 300 PROFITS! Your Own Mallorder Business! No Rick! "Success Plan" Free Websier New Rochelle 708 F 25 New York

15000 FROM Half Acre growing Oinseng er op coug! Particulars 10c. Associated Orowers Speriling Maritida.

PRFE 301 Profitable amad business Am ing or one 1 a a b W rk Besses Ameing vers Kenmars 21 S New York

ADDRESS Advertising Postcards Must have good handwriting Box Nine Watertown Mass

CONVERT spare time space into income istate of any compet tion brief to it is we at poetpard Fr' and Dept H Box 1956 Creat Pa is Montane.

MUSICROOMS grown boxes, barreis Ma-sureless process 50c, Spawn 21 00 Oor-den, 531 William Winnipeg, Mantroba

MAN Or Woman With Spare Time to try our loud and household products, at home and supply neighbors. Make good money Big bin of to size products sent on Free trial Bials Dept 35MP 2. Lynch-

OROW Mushrooms Cellur shed and outdoors Spare fast tune year round We pay \$3.50 Lb We paid Babout \$4.165 to few weeks Pres Book Washington Mush-room Ind Dept 181 2864 Admiral Way Wash Sen life

WELDING Page 338 Learn easily at heat squipped achiev in country Non-pr St School with low cost tracing G I app oved Weire H bart Trade School Box P *43 Troy Obse

B. Y Wh lesser thousands carefally advertised products at big discount. Free Air effica Wanterie Plan Airett

MOVELTY Manufacturing of Ash trays Book ends Picurios part excellent profits. No expensive mods heedet Plastel Box 147 B Pana City Nebruska

PREE Book "505 Odd Successful Bons-nesses With home Exerct Odd Pa-cific JTC Occapade Calif

PANNING Gold prospecting catalig lists a maps maneral books cold paog esson ree Old Prospector 7.9.32 Lod Castornia

DRIFTWOOD Souther details on finding processity famus pragues merchan draing 30c Driftwood, Box 2001 Kenmore

START "Silverware Renewal Service."
Pranction Excusive Musilver 166 PST-PO Autorn In Gold

DOS LARIA in Every Mail Professional Ma. Order Technique Information free Information free dress 61 Charle

BIRDES & MAGAZINES

SPARETIME Profits Taxing Subscriptions Ad Magazines Whi ranks Catalog Fire Calend Agency Westfield I N J

DOOD Used Books 50c \$1 00 Free lints Ed time Dept P6 Hempsteld New York

BOOKS Government surplus Career and instructional Bargain prices test and thatrustonal Pres ratalog A.m. 56 other free catalogs on program subjects Ling a Cur egs Book

BE Rich Make m re money Amaring micross briok 30c Used broks 12 \$1 List tree Person 436 M Y Ave Brooklyn 25

BONKHI'NTERS All Subjects, Send Wantel Jahre Book Service, 430-K East 110 Street, New York 57

NATIONAL Geographic Magazines 1888-52 Aby issue Periodica, Service Bux Any tame Periodica. Ber Wignington De aware 1952

ATHEIST books. Catalogus free. Seeker Co., 38 Park Row New York 8 BOOK Chislogue 1000 Bargains send

10c Boults Pub there Ami store N SCHOKFINITERS All subjects Send wabtel Plymouth, Box 365-A, Far Rocks-Merra d

way New York. MYPNOTISM

PREE Plustrated Hypertern Secretary Secretary Secretary 1234 Wight se Hours Hours 1234 Wight se Hours 1234

Hypnotism in 33 presons Most perfect complete easily learned and even prehetisive course. Mother back guarantee \$1 possessed Buoks Publishers. Amilystic York

LEARN Hypnotism in one week You in any re can Delais free Spec-Box 345 W hee-Barre | Perma

MECHANICAL Hypnolist new invention esuses tran es Immediate y Instructions sec ets Inc séed \$2.00 Clik G.P.O. Box 13.2 New York 1.

LEARN Hypnotism Rend **Happootse** World Maga me 25c Penhwar Buz 166 Scranton Penna

AUTOHYPHOSIS folio, '25 Hypnotless. 25c. Lloyd Culture. Appulachin. Property live Vargitita.

ENJOY Hypnotism for Pun for Health ideal for Parsor entertainment, Ideal for mind improvement. Illustrated. Money back guarantee. 11 postpaid. Books Pub-

MAGIC TRICKS. PIEZIEK, ETC.

MA JE IANS Cambiers breits supplier exposed Free Catalogue Book, Box 471 St Louis I Mo.

500 TRICKS Douglas Ismoon 130 page Catalog only 10c Pattest service to be a gickers for 30 years Send 10c videy Doug-ies Magicland Dept 2 Danes Tetas

E-E Magie Catalog with surprise gift Bc Eastern PO. But 45 No Westport Master busette

FREE Magic & Novelty Catalog, ciudes 14 wonderful magic tricks fully il-instrated and described. Read all about our Free Gift Offer Chicago Magic Center PS-7, 18 W Randolph Street, Chicago 1 * HILLIAM

pocket parior stage World's Pinest Mag c Catalogue \$2.00 (donar trick in-c. aded free) Kanton s. \$-131) Wainut Physical physics 2500 TRICK Catalogue (512-pages)

VENTRILOQUISM Fary to learn in 60 to 90 days. Home 5 udy Course Results Guaranteed For free information write staying your age Dummy causing 25c Free Maher School of Ventriloquism Bus M. Bluste Pol. J. Wentriloquism Bus M Studio PS 1 Kennington Station De-Unit 24 Michigan

PREE Cats on Best Magic Practical ates Top Hat Magic Eta ston 22 In

CONNECT RRENCY

GET Front and Pleasure in collecting old colin Bend 10c for 56 page il untinted com catalog You if he de igh ed with it Bend for it now B Max Mehl 374 Mehl Building Fort Worth Texas, Largest fare coin establishment in U. S. Established 34 Years.

PRFE Foreign coin banknote and Coin Confectors I ustrated Catalog to approve nam Cota Co Burtigheid to postage

UNITED States Rare Coin Value Guide 68 pages 50c. Fortunes in rare colts. Ideal 4644-8 Genry San Francisco 18 Calif

OLD Money Wanted Will pay Pifty Dol-lars for nicker of 1813 with Liberty Read no Bullino: We pay each premums for all rare coins. Send to for Large Coin Poder May mean much profit to you. Nu-mismatic Co. Dept. 30. Port Worth, Tex

INDIAN head cents. 12 different dates in Whitman Holder for \$1.06 Hudson Coin and Stamp Exchange 3400 Hudson Blvd. Jersey ("Ly 1 New Jersey

JAPANESE Invasion notes for U S. 10 to t1 000 06 set \$1 00 100pp. Catalogue, 25c Shults Sait Lake 10 Utah.

COIN Magazzie 100 pages Sample 30c Numerimatic 7320 M. wauken Clicago 11

INDIANITEAD cent lour page barnalh tiat 10c Economy Saves 156-Il Donn. Manofie d Muse

60 COINS and Bills \$100. Oddehon. Box 482 St Louis Missourt

WORLD 8 Greatest Magazine for puln entectors and wooden make | 10c Law-erice Brithers Aramina lows

BIX different UN Ind an Head Cents for The E ght d Servit I berty Head Nicks a for \$1.00 five d Serent Canadian Large Cents for bor Price I ats of till and foreign coins free No app. nals sent Breson Stamp Company 5.1 W. to To ado Ohio Brreun

NEW 614-Carver \$1 50. Washington 21 00. Giant Doth Catalogue 25c. Bebee's.

LARGE cent le le al for \$1.00 Bar-gal: Let included Delmaco Box 21228 Wilmington, Delaware

STAMP COLLECTING

200 DIFFERENT Including Roservelt triangle 10c c approval aggrapts 2 Av-

PREE Complete set of Pamous Ameri-cans Plays Parks and Presidentials to at love buyers field & for 13 of the above stamps plus and purticulars Tri-bers Stamp Company 145 Massau Street Dept 207 New York 38 N Y

Pol AR Bear Triangle; Giant George Washington Str Colored Schador, Arctic Line sie Grat American commemorative Corsica Devile le ai d others Everyth, g free a th approvate Capital Stamps Littie Rock 10 Ask

65 Ald Different U.S. Stamps Includes to ye dids commemoratives strmats and 65 06 Stamp Orly 10c. Approval. Willett Co. Box 511-M Port Chester, New York.

AMAZING Offer! 200 United States stamps sheltding communoratives, airmails high denominations to \$1.00 only 10c to Approval Applicants" I ustrated Sargain Lists free. Mystle Stamp On, Dept 35 Camden New York.

FREE Stamp Collection -100 different stamps from Europe Africa Asia Scandi-natia Sa tam etc Ic o approva, appli-cants Tatham Stamp Co Springfield 56 Manageringerin.

127 DIFFFRENT Stamps 25c' Inc uding early Canada New undland Briti h mues Vatican Red Russia. Heads Indian States Animais Airmatis French Comies Rarities Unissists Every Stamp different Bare bargain with ap-provals Mobey back guarantee Niagara Stamp Co Niagara on-the-take 42 Cunada

PLEASURE in Yours for pennies when you esteet from our his houls of 1 600 stamps. Clean and neatly arranged stamps for your street on Scott's missey number and price under each stamp but large dustounts allowed. Write today and watch your desiretion grow Worvering Stamp Bervice Dept 3-32 Fruttport Machigan

PREE' Big United States Catalog Valpake guide and check lat Rundreds of tl'ustratione. Approvals, Harrisco. 400-F Transit Bidg., Boston 17 Mass.

223 STAMPS For Only 16c! This maremoth value includes Airmails, Pictorials stamps from strange Countries entaloguing up to 25c such A so approved Mastic Blamp Company Camden 33 New York

"WOW 153 All Different Germany 10c" Ecopolina Semi Palale A mark Burk Values Big Bargain lists and so-provals included. Jamesteum Stamp, Jamestown 500 New York.

SAVE Morey! Buy stamp packets. Worldwide as action Barga it Mate free Worldwide as action Barga it Mate free World 200 Quarters Sun Prancisco IS Co. if PREER-Valuable Illustrated Catalog. Over 1100 special offers, attractive Bur-gains' Appravata Keumore Mu'ord SC N H NUDER Set resortal approvate light Atlan 1889 P Elser hower Racide Wine

COLORAL Blamp Zon 10c Jungle Bears Widtsfe Doreric anomals Fil-teen differe i tre d. a Rhinoceria Rio-phant Snake T. er Zubu Kangaria Kastabear Emu Kockabi ta Bu i Horse Fairacreme y ac amounting a per vant Bered the For Postage And Rand og Former Stagers on the Lage 52 Carada

130 DIFFERENT Worldwide Stampe 25c including Ritter Reads British Colonies Prench Colonies, ratities, unusuals, Everything complete life to adults freques ing approvals. Canada Blaimp Co. 180° Main St. Dept. 112 N agers Fa is Now York

sos DIFFERENT attractive stamps a special assortment worth many dollars. from Macan Suanda Lrunch Conso Mofiaco, Vallent, Angola Menambrue etc Entire collection only Me to approve ap-picaria U.S. or foreign Rose and States Co. 18pt B 12 Spring Late Mich

PREE-108 different British Colonies-Aden to Zanzibar? Righ Catalog; pictori-als Approvals Bend for mailing Kes-more Milford ST M N

PREE 119 Pereign Stamps including Af-rice Assirate Fakistan, China, India, Russia and Standth arts Soud 10c for postago and handdarg With approvals, Stagara Stamp Co., Singara-on-the-Lake Canada.

to DIFFERRY C' & Se with bargain approvate justs Soutman Manufee 2 Pla. Piker D R Bet Among World's Pret-tiest Only life Approvals. Weses. But 1344 V New York City 8

ANIMALE Birds Triangles To were Burterflies Tish Ships Laborated and Kings Inctators Multireleved Rist Scal. Courreptions Musical Button Change Musical States Change With Approvals Adults press Canada Biamp Co. 1987 Main St. Dopt. 318. Hange Palls New York

ton DIPP Latin America 25c Even-tions, Bonus Offer Mummoth Packet List Pres Scotopackets, But 165 PS. Riverside 22 Cabi

MINT atemath sets on approval A R OENERAL world wide told school way have stampe or get them! dealed of stamps. For attainention write Suphia decimen Coupes a Washington

PABULOUS Culection Reserved and Dirigion Stamps Mammeth Instinating consection of Roosevell and Dictators including Stain 3 Ita Franco Lenin H Ler and great many others past free book of and burgs n of A for for 0 th approv-ate Jamestown Stamp, Dupt, 438, Jameslown New York

Offica Kill Co lection Pres Includes Triangles Early United States Animals Commemoral van British Colonies High Va se Pictoriais sic Losso,eté Collection pius Big Liustrated Magazine ad Irea. Bené de les postage Gray Stamp Custe pary Dept PR Toronto Canada

PREE Prized set of 4 United Potions Stamps sample stamp sevapaper Send the to over handling souts Appressat Littleton Stamp Co. Littleton C2 S. M.

FREE with approvals—Israel, British, Prench Colonial, Latin American, U.S. packet. Philo, 1469 Dressi, Miami Beach, Florida.

OREATEST Pres Offer-Creatia Exile Covertment Air Set gorgeous birds, aut-ural colored triangles. Also albums sup-piles. All to our Approval Supers. Buil Stamp Service, Dept. W-5, Bell. Calif

LOOKING for better U.S. Approvals??? Try New-Way Stamp, Lawrence, Mass.

TERRIPTO Trimogles Prigotical Plan. Christ Volcanors African Screen Otant 20 year Tamanie Presi Harber Jane-ness Philippines Dund Lands etc 3r to approval Supers. Peternat Stampess. Weakington is D C

EXCEPTING treasure hant! Cloth but motaining over 1 800 majorted stamps on paper weighed out as impuried treer 30 austires Prespend guaranteed on 9 81 Harrists 400 Transit Side Boston IT

PRILIPPINES-30 different 100. Approved M. San & STI Coolings Rack Hall M South Capatha.

TELEVISION stamp and to different to with appropria in Response OFO Best

TOPS: Free book "How To Collect Stampe" Send for your copy today Approvate, Littleton Stamp Co., Littleton El N H

PICTORIAL Angola Morambique, Run-gary a fine assistment of stamps 3 dif-ferent sets deposing widelite in natural cubits plus 100 attracts e stamps 10c to apprecial apprean a Modern Stamp Ca-Lieux R 6 Ferrysburg Mich

EXOTIC Orienta, Collection 106 all different stamps from Serneo Horg King Maigh Sernwal Kotta Japan and ma y of et strange then rice of the Par East post flor housing and bargain sets Allor on y life to ment approval meaturers. Jamestown States Co. Dopt. 316. Jamesto New York

BUGSTVELF Greece Pups Triangle Ores and Israel St schera is Approvala-Larghera But 1966 P Lubburk Teasa

100 JAPAN 10c Atl different with ap-

ELONOMICAL . 2 20 Appricals 22 100 Y has bee York.

WEIRD faminating Congo Idole, (10) only 25c to applicants for better grade Political April a.4. Paint 1146 g Westminster Albambra, California.

to one STAMPS date Crabbag too Big lot better stamps \$1. Form special \$2 Clicat assurement \$5. Pers 1 436 M Y Are Brind his 25 New York

OLD scarce U. S. records on approval Bigitts do so the he make prices Headle-ted C. niner J. Station Henery & H. J.

56 D PYPATNY Bulgaria 16c) Approvals Energy Stanig Company Dest & Bordan Averus Paternic 2 New Jersey

EASLY US and moved that p us to other rineteenth century lie to approval are reads: AAA Stamp Company, Areads bu ding St Louis 1, Missouri.

PREE U S illustrated bargain catalogue. REAUTIPUL New Zealand 1942 Et a

beth and Margaret Rose tetante on only to agriroval applicants George Richie.

JAPAN-100 different—shuckful of Com-memoratives. High Values Pictorials Ex-ceptional Value—just 10c. Appealing op-provate actionputy Viging 1) P Northern Live. Great Seek New York

PICTORIAL Lot-triangle, bicolors, etc.,
bure value, Only 10c! Approvals Cole.
43-O Rinewall, Buffale 31, New York

WS buy mint U.S. Collections, Write, New-Way Stamp, Lawrence, Mass.

REQUEST approvals receive Landy ishard sheet free Elmont Statepto, New York 1, New York

FREE 100 Pervion stamps to all re-encering U.S. approvals Peacord Stamp On Box 2.6 Westuped New Jersey

START your own stamp business, Send. 1147 Chicago.

SENSAT ONAL United States United Mations, Confederate States estalogue from Stone's, 45-8 Bromfield, Boston S. Mass. UNITED Nations cover free to appli-

cante of U.S. or British Colonial approv-PREE Sample—Interesting informative.

ron South Carolina.

BARGAINS gasors, low priced approvate. Chur Box 117 Williamsville 31 N.Y. UNITED States 40 different 10c 40

different Companionalities 2.c No approve all he denderg Appleton 544 Williamson WONDERFEL Offer Breen nomi sta mint sets only Me with approvais. March

100 DIFFF HENT Spain De Penny appo I crusti

PYNNY Approvals journed with Bar-gairs. For briter values try Putnam a amp Company Mahoper New York

LOOK? Ton beautiful nets, 10t, Approvals, Parmer 4012 Bustwood, Les Angeles 4.

160 DIFFERENT atrmatio-46s, Approvule Boulder Stampes But 678-6, La Mant Could service

MONACO Nodes' emplete the with approvate Royal Stamp Company Tomo-

PRICE Latest exclusive burgain entalog attractively innatrated Over 1 000 Mixwith approvate. Toweres, 1638 & Meires Chicago 11

196 DEFFERENT US Commemoratives for \$1.00 .30 Defferent US Commemoratives for \$2.66 300 D flarent US Commemoratives for \$4.00 Price .its of USA and forware stamps and some free He approvals sent with shows Bryson Blamp Co. 5.2 White Toredo Obis

PREE price list new issues of the world. Supreme Blamp Service. 2205 St. Grand Avenue. Los Angeles 1 Canfornia

100 DELIGHTFULLY Different Worldwide Stamps 10s. Seifert's. Box 1873 Reading Penns

ARMENIA Pietoriau Value 65c Proc with Apprivate Exotic Box 765 Miami Brack 20 Fig.

1' 5 too different off paper \$1.00 high malacres to be he appropria Whyte 330 Oak ord Street West Hempetend M Y

US approved to pt used US approval as ht used Square Dear Ten h. 3 3 8 Hollywood Card 2000 OFFFFRFN & World-Wide 14 No 1800 - 85 25 Bestian Empire, 500-42 25 1000 -86 00 PAS Bus 367. Lindenhurst. M. Y

256 STAMP binger and 36 different Austraits free with approvais Jayses, 211 West Dickinson Grand Rapids 7, Mich.

PATING Wigh Prices for approvals? If your collection numbers under 15 000 try our to acid to approve a fit builts of | 400 B sectal offer to customers C E a so and in also Clark Stamo C Dept. B-42, Mushegun Heighta Michigan

ANTIQUES, RELIES &

THOUAR Bondwork leathers bonds feathers meeraalis wide asymise buy-ing direct from India a prime reason-able Free Lat Pawnee 2 12 a Indian Trade the Post Bon 22 PS Pawies Obserboten

6 FINE Indian Arrewheads \$1.00. ciched fint iomahawk \$1.00. List from Laur's, Glenwood, Arkansas.

ANTIQUE firearms, swords siged weap-ona, illustrated hooklet 35c, Westbrook, 138 Royal Street, New Orleans, Louislans,

MINERALS & PRECEDES METCH NO.

"GENUTHE" red Arizona Rubice (Oar-nets), Bend muster for packet. Bringe's. Bug 1625 U Neutrodale Arizona

DINGSAUR hone turned to stone, made quarter for specimen to Sone. Box 11 Rowling Green Station, New York 6, N. Y

OERUINE California Gold Nuggets ombedded in jewelry, Write. Shipler of Etna. Etna. Culifornia

GENERATORES Maneral specimens Origin Con tera utanium empion Every variety Lawret prices Pres bushlet Plainmer & 4 30 Futnt Lama Avenue Ban Diegu 7 Carif

GENEUTTING Suvereals nutbority, Phintrated magazine tells bow Cut rocks, make powery 156 and 1 lustrately equipment offering sents for a series of terms. Paral telling thereture Lapidary Journal, Drawer D. Pelm Doort Co. il

EAPPHIRE tourmaithe topos-gainet -peridot 5 uncut gent aperiment 6: 80 O Bisers 11:68 Wilcon Horywood 28 Cal

35 ReXCKS minerals mounted identi-and described \$2.56 Bar Triple Q Bunch. Box 7304 Tursus Arisma

GENUINE Desirand rough-one earsity 230 so sample diamond, \$2.06 House of Diamonds Box 1218E1, Orand Control Station, New York 17

12 GENUINE mineral specimens \$1.00 Capital Genu Schuldt Orange N 2

MORRIDO, COLLECTIONS

SMAENTING can be an interesting and profitable hobby. Write for complete par-uculars Institute of American Inventors. Dept. No. E. 631 E. St. E. W.

36 DIFFERENT army embroidered patches \$1 Other bargains Insignia Mars 1938 Broadway, N T (J. 3

26 ASSORTED picture postcards, 26-10 years old \$1.00. William Brown, Mailing-cock Avenue, East Islip. New York

MILITARY Ministeres U.S. Martnes, American Revolution Civil War Custer of Ca any Lists rated Cutalog The Busines M. satures Dept. E. 30 Stanesh Park, Qu. 12, 65 Mass.

WANTED - Cuparette tobuccy curfe.

RAISE miniature trees Only 13 inches in I Nature a manterpaeces' World's reast known most prof able hobby Detain free Minia are Forests 125 Bankers Trust B dg I discopalin 4 Indiana

PHOTO FINISHING, PHOTOCOPIES, ETC

TWO Prints each good negative. \$ exposures 150; 12 exposures, 50c, reprints. 4c. Mayfair Photo Service. Box 617-A. Tutedo i Ohm

8 EXPOSURE rolls enlarged for Pastest, Finest Service Camera, Dept. A Box 250 West Chester Panna.

NOW 14 hour service 6 expenses to a place tach 30c; two each 40c. Add 10c for 12 and 14 expenses 20 bears d prints on double weight paper from print or negative \$1.00 L. A. Eastman Studio. Bode, In-

DISCUSTED with poor photo fir shing? Something hew See & film of friques Your credit in good Statement with firebold Jerra Dept D Box 1301 Lansing Michigan

8 JUMBO Prints in A bom 30c 12 exp 45c, 39 exp. 45c; 34 exp. 42 25, Prec Majler Mel's Photo, Box 106D, Brooklyn 20 New York

ROT19 reprints jumber in burns 1 30c 12 40c 16 50c H in Photo Buz 22 Pairmont West Vergt va

YOUR Plans Are Valuable—Don't lake changes on prints Let Whitehall skilled finishers with years of experience, most modern equipment, highest quality material photo-fields your films for very best central flavoraction quara tend or money back Only \$1.00 for one are prints of a y 1 or 12 exposure flux P as new fresh y dated Kodak flux 14 hear service. Free Catalog of Pin a Nice see and Particles of Catalog of Pin a Nice see and Particles of Catalog of Pin a Nice see and Particles of Catalog of Pin and C

ECNO-size prints from your roll film less than 50 each, developing included. Pipest qually and service from plate capita, of the word Over 200 000 as a read customers & exposure roll like (12 400) (16 15c) (10 5c) (16 15c) (16 1

Strikes prime seemente rolt 30c. 12exposures due 10 ec marten 85d. Reprints overster de Couranteed quality Mail Order Photo Service, Box 207 Watertown. Wantoutti

exe OR 2' x4 oversize g' may velox prints a exporter to too 12 exposure too Hagner Philip Herrice 1316 West Columbia Avenue Philipdelphia 23 Pa.

spend frontilly New 16 overs a contact prints or if plantic best if supers at album jumbo priots with your first roll like A bum Studios Westherourd Okea

FREE Mallers & contacts 30c Jumbus the 13 the Jumbus his topy to te
Jumbus be Western Photo Pura Box 200
Bun Francisco L Calif

BERMATIONAL Stumbos 25c 12 15c 25mm 36 appearer 51 00 Grandered Quanty With this of only Frank-Pulss Box MA Brook on 6 New York

TWO Bits (25c) & expression foll developed Jumbo prints Electropics by price eased astrophysical general ced of expression for the expression for the expression of the expres

354M specialists. Fit egents developing 20 exposures 6.50 M exposures 5.40 Free matters and pitters on a here, Topo Photo Service. Lyons New York

PHOTO Copying, and Enlargang, Free astuples and prices. Wast Photo Service. Byars. Oklahoma.

23 MOTION PICTURES, STATES, SOUND EQUIPMENT

COMPANTEED Fresh Smm roll magasine 16 mm roll made me bushe but Come bern Free co. 4 Eso H 47th Hury Kumas City 2 Masseur

a 16MM Shent-sea d Dima Cumplete rerta, thrary A. atest subjects bree catas que sam le Sim Ger Unroma Film 7 West 50 n. New York 19

CLEARANCE Sais of 16mm, sound films. We had real buy in 16mm, sound films? Take advantage of the ICS 1954 c raracte after the control of the Carlon a course of the Carlon of the Car

PREE Grant entalog of Stam & 14mm films for home movie enthusiants, Pilms for every occasion, Lee Stann, Dept. PS7 11 Willard Ave. Mt. Vernon, New York

5 000 2-16MM, Silent-Sound Plims, International, 2120 Straus, Brooklyn 12

MOVIE Camera Film: 8 mm roll \$1.80. I i imm 100° \$3.00. Proc processing, Better Films, 742 New Lots, Brooklyn, N. Y

TAPE Recorders, Tapes, Accessories Unusual Values, Dreasner Box 46 Peter Stuyresant Station New York 9 S Y

ANNIVERSARY Discounts! Mories 5 ides Causeras Accessories. Catalog 18c refunded. Variety, 268-14 78th Avenue. Plural Park New York

PRZE! Blackbawk's summer sale catatog new and used form from from used form assend projectors new ?' I' ever sides Hunkbank From 1145 Castin Durenport Iowa

8 & 16 MM Professional National Parks Movies in full color Reasonable Ideal Service, 4644 Cesty San Prancisco 18

31 CAMPRIAN, PHOTO SUPPLIES

PROTOGRAPHY For Pleasure of pt. 51
Learn at ome Practical basic traiting
Long established at a Previous set
American School of Photography Son Dise set Parkway Dept. 22 Chicago 14-11

BASS Says Quarty Cameras Since 1916 What in Chicago visit the Camera Cross Reads of the World or note as the equipment new of used Saturaction Guaratteed Bass Camera C. Dept. AC 178 W. Madison Street. Chicago 2 Linkols.

tors ape recorders lenses Will e for individual min-fatte in the Catalogs Cassified Camera E 253 E 94th Street Brookle New 1 rk

PREE Photographic Bargadi Bunk packed with build eds of F e values to at and movie cumeras jetues and talest accessories both in few and wind. With now for pair free cupy to Central Camera Cu. Dept. 110-240 B. Wabath Ave. Chicago 4 I I. (Photographic Bendogarters in its 1866).

20 TO 40 discount everstlying photographic Dart 38 P Alauntic Avenue b - kit - 24 New Y 18

No.W Manafield form action editor comhitation is revised appear etc. Or mal cartons \$20.07. Same in 15mm \$25.07. Free catalogue 1001 bargs is Desice a Mart 54 Percely Rd. New Rochette R. Y.

OIL Coloring Photographs A fascinating labby of profitable indefine for those with a fast train at laborating simple red method Free bank et National Proto Coloring Behand US Diversey Parkway Dept 1728 Clicago 14

15MM Caparities 25 for 81 60 Caparities Box 1870A New Haven Conn.

CAMPRA bergain twin lens refer with a de meanied flash attachment and carrying strap takes rolar ut black and ut is pictures inside or out Orly 06.45 puripaid Miney back guarance to N. s. 715 Broadway Back Springs, Wyo.

WHOLESALE Photographic Supplies, Cameras, Prims Projectors Enlargers, Write for Free Chialog, Capitol Photo Supplies, 2435 Guadalupe, Austra, Texas,

MEMIC, MONE WRITERS

WANTED! P eme for musical settings

POCMS Wanted for musical setting he a preme Free Examination Five Blan Mark Marietz 646 Beacon hide Boston Mastachusetts

Ray H libe er C-15 6400 Otender Chicago 31 Illinois

SONGPORMS Wanted, Mail to: Tin Pan Aller Inc. 1856 Broadway New York 12 M Y

SONGWRITERs! Protect your poems and songs! Dun't mail anywhere! Write for a procedure song service 311 W 16th Dent PS. New York 19 NY

FREE Record of your song Your words My me dy Pres intermatian Joh y Mark a Me dy Mart 1024 West 38th 2 are, Deut K Los Angeles 27

POFMS Wanted for musical mitting Set d poems Free examination. Crown Music Company, 1672-F Broadway, New York City 36

POEMS Wanted to be set to inusic. Free stars 44 na Send porms McNe. Master a Music 5 0 PS. S. Alexandria. Los A stress Carllotnia.

FOLKA Walts Schottische Records Free att state record speed H 1 Revncids 5:0 West South Street Sauna Kan

BONG Form Writers A limited tumber of 8-ng Porms can be set with pricesional companies with RCA Victor recordings. For incormation write Agency 41 8 Broad Woodqury New Jessey

SONOWRITHES! Send porms songs. Music Service 143 West 72nd St. PS. New York 73

AMATEUR Songwriters Top - Notch Broadway Staff Offers expert professional opinion suspections for insured by your song of lync Enclose \$100 with each manuscript of fecunding Amateur Songwriters Workshop P.O. Box 159H Times Square Station. New York M. New York.

WANTED! Poets for musical settings Write Songwriting Service, 2939 Division. Chicago 22

1954 ACCORDIONS — Wholesale, Prescatalog, American Accordion Center PS-7 5129 Bermont, Charago

POPULAR Songs How to write and self them Wr. e ; r free backlet S cress at Songwriting Ontewey Songs. Buz 2470 Hollywood 20. California.

SENSATIONAL * Free Melodies Lyrics A a sia Keem to Song Service 1200 M sey Sciano 9 Per in

MADIO, TELEVISION AUPPLIES & EQUIPMENT

NEW TV Catalog Free. Loaded with bargains for TV servicement technicia a time em Puest hew TV anten as Mola less Directedics Multi-Chainel Taxas UHF A et has Unserters Minute Bouters Parts Instruments hundreds of quality accessories at money as high prices Oct your cut high is w. Na total Executions 4001 De on Ridg Coversald J. O.

BUILD 18 Radios At Rome only \$10.90 com, see Learn Radio Construction T evry Trouble-Shooting, Code, F C C Requestions Complete Radio Course includes als parts computer to the following Post of Process and Reserving Iron you keep everything No experience required Money back Chura tee Order direct or set for descriptive attemption Valuable Radio at The Childs upon request free of charge to obstrated Progress to Edu-Kits the 487 United Ave, Lies t. Ph. 18 Brooklyn 11 New York

MAKE Simple. Tubeless. Deterpiess.
Distance-Getti of radio Getspine Menonité
crostal Detector Hustrated Instructions.
See postosid. Alien. 427-P88. Clinton, Mu.

BETTER TV Reception with our metalic tape indoor antenna ket. Your Choice of Channels 2 thru 12, Postpaid \$1.25. Riverway Industries, 1125-\$th Avenue, Long view Washington

OBJUEN Counter and Metal Detector Kits, Inexpensive, Educational Free Literature, Electronic Applications, Dept. A. th v 4015 Washington 6 D C

CRYSTAL Radio experimenters, Write Lesile Hulet R 4, Lakewood, New Jersey

15 TESTED One-tube circuits 25c. Including Hadisburder on alog Laboratories 226-1 Funer Redwind City Cant

MAKE simple powerful distance setting crystal radio. Works anywhere. Hiustrated booklet fifteen cents. Money back guarantee Francis. But 1943, Oleveland. Onlo.

PCC Commercial operator accuse tulcky Craft and Dept 5 5064 Holy-wood Blvd. He is word 24 Ca. Jornia.

RADIO TV Condensers Resistors 16 piece assortment \$1 00 Zach Bair Ediato Drive Grangeburg South Carolina

ATOMIC crystal radio 60c wired houd chara; eed (maso, 2066 68 Street Brooklyts New York

NEW 150 VDX abline rotators perly \$38.
p.p. Vermon Medicak 121 Pine Jackson-

EXTRA loud crystal set. Really separates stations. Plans 50c. Utubusi d retr me devices to build List 25c. Missouri Electrorics. 729 Leadington Webster Graves 49 Missouri

REPAIR your own TV Detailed instructions prepared exclusively for your model plus introductory bonus. Bend make, model, \$1.00 Personal TV, Box 86, Later Neck New York

INCREDIBLE One tube radio receives televance. FM CAP and ama cur broadcar a Very easy and mespensive to build Dougram with special tube only 12 00 Springheld Enterprises Box 54-A7 Springheld Ga dens 13. New York

CRYSTAL radio electronic amplifier breats signs power 181 Completely wired and with tube only \$3.00 High speed Enterprises, Box 54-A7, Springheld Cardens 13 New York

experimenters swi a Valuable data July 'Radio Science' 25c. 12 Back-man Westfield New York

REPAIR your own TV! Instructions compiled exclusively for your model. New expanded book makes repairs simple as replacing light buib. Send set name model number \$1.95 Satisfaction guaranteed or money back. LS Engineering. Box 4112D. No. Hollywood. Calif.

GOOD Paying Business Silvering initform plating autoparts, reflectors, birsches hathroom fixtures etc by late meth-da. No tanks or shop required, outfit fur-nished. Free Booklet. Cummetal Co., Ave. Decatur Linnois

OPERATE profitable mail order business. Write Walter Service, 4156-B East 112th, Cirrad b CH .

MAKE money addressing envelopes. Our instructions reveal how. Gien Glesway, 5'1 ? id Cieveland 7 Ohio

fit to me tature thing trees only is a 20 merce to Gree at Hour Ba Profits House time or perturity Fascinal rg Ams is We a for Free Beed and Plan National Bursery, Dept. CG, Ingle-Wood 6. California

NEWEST Spare. Pull-Time Business. 25 to \$16 hour possible. Paint with Suede—the finish with touch And eye-appeal. Beautify auto dashboards. signs. radios. tota figurines. [amps—1 001 others. Compete State of the Branch State o no-risk examination, Free details. Coast 1804-MCI So Los Angeles St. Los Angeles 15.

IMPORT-Expursi Opportunity profitable bord tide me der bus seed from home, without capits, or travel abroad Established World Trader shipe perience unnecessary Free details. Mel-Liger Add Los Argeles 36

MAKE Money spars or full time, carting Metal Toys and Kavelties. Big wholesals and chain store demand for Auton Bolfor the hunt Product in mondo for n scied for up to 100 and in re can't an per hour 30 i experience or special place been as y 100 the fire to be mantage, and to justrations of patterns needed Metal Cart Products Co. Dept. E 1886 Boston Road. New York 60 N Y

VENTING Man not be selled erate a route of colo machines and care arkway Machine Corporation Dept. 15, 715 Ensor St. Baltimore 2 Maryland.

RECAST old balteries into new Latest achievements. Battery Laboratories, Min-Denia a

ENVELOPES addressed accurately rea-portable Past be view We have capable add easers in your city Olemany System, by 5 % Excite Gleveland 5 Ohio.

BRFF.: Stare Tropical Fish at home Farn fl.s Miney' Learn Secrets New Ath home demand. Amazing Opportunity: Free Plan. Tropicals, 1888-th Los Angeles St.

REPAIR Dolle; make rubber stamps Catagor ''80 Ideas'' Free, Universal, Sun 1016 B People Labour

FIX typewriters. Prec booklet describes sur modern, hierpensive hame-study source, Factory methods taught. Write Typewriter Building 4, Terentum Penns

#25 WERKLY working two hours do by at home. Lyste, Box 3471-B. Cleveland 12. Objo.

HRONFED beby shoe metallian a equipmer t New and med But telection of the all a f onen mountings from esta-logue No bywood Br a to Supply 1424 A E Piret No set Los August 22 California

WY Live our manman He leaves over \$5 800 00 m offs \$1" of furn ma bist Mp or egg may r is resend the toth was do Et 242 to e h mie ma lorder metbid a Trusa fanch ove at we a wars we red. N to we sell the Ra ch Mais rest Merited Ocerates anywhere It quite Events gabade Nanch Heiste Texas

of Write Briefen Laverne & Catt Withirto Make Big Money at home few ties for us It's tun Kare \$10 day easy Mo selling no shierteness no machine hereastry. We supply everything He h us ? huge demand Exciting details Pashton Ties 2321-X Manchester Ligitarial & Can orbita

Print: 301 Problem Small Bund heates!" America shoestring being W & Hune! Start Sparetime Dr. mant Surveys, Kenmore 28-8, New York.

MAKE Money At Home as renewal headqua te a for all magazines. Liberal commissions. No experience—No capital needed. But, the last a sed Write for Free Cata of McCircgor Magazine Agency. Dept. \$108. Mount Morris, Librola

ADVERTISING book matches Cash in on his derivate sel Union Labe matches. Cula for all het reses and political par-ties Pres powerhouse se its hit sow prices protection guaranteed on repeat orders Cash commissions Superior Match Co Dept PX 754 75:90 creen unit Chicago

BIX Magie words for filancias success. This will make you think 25c Jenn. 4 Company 1.3 BT Napice San Francisco 12

\$1.000 MONTHLY possible from your eval easily learned office business. Write One (*social at Saxamase 2 H T

PRINT for Profit at home Amoring new method prints colorfu posters hasnors g setting cards grassware at jobing Bundreds at time No press needed No art Pur tantle pr fits. Wood representat ve your area in mediately! Prou home bust best plan Berren Print. Lan Angelon 15. Ca Jornia

LEARN Sewing Machine Repair electrily trade sell. How to make Big Money at home sourceme New Agrag Elections, parts etc modernie Proc Scialia Tapion Service Hamilton PS 7 Otto

Appropriate Advertise of Post and Most Mary

All again on are new toy makes pos-able \$6 . on in: of 246 etam of \$2.00 B A Alred \$410 E Brendway Pt Worth, Texas

NOTARY Public appointments. Our 28th rear Inquire: Stationers, Helotes, Texas.

MINE Realing information free. Comleta Luke Superior Mink Parm, Superior E E5. Wisconsin

RED Hot Home Business. B.c Pr Cts. Details and Material 25c. Diaz, Box 11324. Tampa. Porte-

4 000 000 BAB.ER bern year y Bubelan-tial income opportunity Homerest, Bed 73. Brooklyn 28 New York

BALESMEN'S Big Opportunity! Do you trant a business of your own in the furra-tive on as agency held? Soud for Pros-Examination our of How to Become a Exampleation copy of How to Boome : No the hirt put car plat your own har read rid t now with no other morn! ment but your wan so es expended. To a he with not up histories structure of a sales agerry bus sens flow to get lines-16

PINANCIAL Independence by Mail Order Details Pres. Opportunities I s-limited Dept. 3, Bux 1576 Souton. Muss

RAISE Earthworms'! Easy! Profitable! Disne brings information, unusual True Anrehmunter Brutem tell fie Mourie Cnell

Militalit PE profitable bome beautres & tails free. Eoster Climax, New York.

MEN Wanted-Build Luggage And Cases At Home. We sell your products—supply complete instructions, materials even thing No special equipment seeded Pres details. Casecraft. 863-M7 Sunset, Log Asgeles 12. Cutt.

CET \$16 Orders By Main 160% Profit. Mark

STANCE Money By Mail Defails Offers Bungares Buy Mail The habeaus Bunger-po era P.O. Bun II Beleskipts IT N. Y.

JAPAR Imports O usual products in-THE JABLE SOURS FO MIND CHARLES WE AS

\$47.00 DAILT with \$86.00 Hawking Equipment Papers 300 PS Mathettah. Br. A.vo. 22 New York

NATURAL molding rubber overs thick. Pres sample Flock W. Daniel. Peorie. Illinois. ₩. Wooley, 115-B

PERMICHAND made full op erickels and haltworms compared tratalectures \$1.00 Pie paid Carter Weem Company Plains

TO \$16 00 week 3. Houset me home upsinner's pean Everyto be an posed Lyrn 194.6 C Mattanul I on At reces 34 Cand

THRILLING Profitable Rome Business. Make fast-seller chezille it uses trees, dolls, flowers Terrific hunday demand Information free, Velva, Benemia 17 N. Y.

HUW at il where to obtain Capital' Pres deta h S'ar de vice Wapubolieta Obia.

OPERATE Escavator Madorder aretern seurce sur products of any products. Par'est, most return strang manorder are-ter known We to be byen Decatur 307 ID

LIQUID Runber make flexible maids. Proc Sample Chatter 1130 & 10th St. Jackson, value & Fin.

EARS \$ 5 000- \$10 000 Argually Probthise protected Guaran and Business \$12 500 or money back Live at home. No merchandise to buy Self-employed One of the most exclusive and noncompetit rebusinesses in United States and Causda. Brid of free explanatory brothet Harrell & Company Box A-7 Louisting Harrell House To Build Your Own Malorder

Bananet Copyrighted He Baland Bere-Tuctor 1

MAKE Perfumes Other Profitable Profi-ners, "Carelabe" 1914 Chouteau-PS-7 20

Louis 3. Massourt "MAKE Perfumes." other products-Sell

mailorder-Purmula Catalogue Free In-3. a ross. EARN extra money weekly maying circu-

tare for advertisers Complete instructions —25c. Siwastian, 4317-B Gioans, Emburst 73. New York.

MONEY in Operating your new Points Pried Cake husiness. Tested new forms a PF4 Detailed I alreations and how to get started place for a rections and how to get started place for the arrange of protocold lerry tory book PH Aunt Haren's P jedcakes in E Constant B cert Auturn New York

WANTED Home Produce a by manu-Become subcontractor can one y as sepreducts for corne companies Thousands of Easy to make steins frusteed for our contract to dust tal use Cast at at his emission papers in Pinate service Associates (Sept T PS East Moston 36 Me eachwells

START a protrable qual bristress in les ruetante t runt free Q Bonnat. red O t de Are ne Chicago 68 I trust

MATLON FR. Operate by higher hims Bush sens us of Fred Advertis a blirth of Reves of the presentation for hander 1970 Usb M. viscost I in Augustia 26.

NAM SPAPARS THE Stocks Disco cash

Eightree methods, listractions soc. Obsesses Company 13-ECP Norwood, Ohio. HUGE Profits! Operating mail order business Write, Steinbergen, 1274-E Steb-lens, New York City 58.

William War ed to new ready out nock Wear Materia athinied Busing Help fit huge dema d Details fret Neckwear Source RN and Politic of a her ment T. R. I N. s. Pla B. My arter v d.

MONLY Typing-hering Deta is free Diseases 15:10-128. Des Montes 15: LUTA

P.ANN.NCI to start a new business or need cap tal to expand? I can help you ? S Wa slow 4966 Marine Days Suite 635, Chicago

Offic W. Munnessens. Co or afted a of sector 28 Brace full time. Fear found Wa pay a. 10 to We paid Bubbitt \$4 165 00 in lew works Free Buck. Washington Mush-room Inc. Dept. 176, 2054 Admiral Way. Wate taffer

RECOME A Came Warden, or join Portion services. Enjoy sutdoor work gad pay real security Complete information Pres Write Home Study I at a 3.36JY West Eighth Los Angeles 5, Calif.

MAKE flexible moids. Cast pluques, fignut Hamilton_Onio

SFI ! Books, Merchandiso By Mail Good Profits, We furnish directors, man se-ship your orders National, Box 86 Dur-shesser 32H, Mass,

WHAT 6 Y mr Plotd Of Interest? Whatever it is specialized magaz to wis bein you git ahoud Knamine current courses of those construct pour fless to bug our fless to Get Acquainted service. The man truth 6 MT cover in all to do -basiness trades agricultural professional traurance real entares and to do sports see Curre 1 Lat Free Company bes Morth Rivier Indianagues 19, Ind.

BUY Wholesale—sell retail Brand Rame appliances watches, etc.. Pull detaile—Country loc I grow tonal Baise Cu 175-B Pitth Avenue New York 10 N Y

6236 WEEK sep. r of Pape nook 566 Odd Boscess at Businesses, "Work home! Ex 601 someth" a Odd) Pacine-36C. Ocean side Ca. r of

2" FCTROPLATE autoparts, nove ties busine pricesses. Pres booker, Tyco Metale, Box 19391 CQ Houston 19 Trans

PLASTERCRAPT mosts liquid robber plante a flocks cardie subjects Co a st Rapida Karissa

HAVE Home Mull Business-Get \$18 Orders in Every Mail-Keep \$8 90. Every-thing Purnished Rutchinson 461C Adams. Deretten er 27 Moon

EARN \$2.00 Hour! I do-making Sau-dala Younga, 1906-PG South Pirel, Ar-cadia Cara orate.

HUNDREDE of ways to make money! Sond for Indet A H hop Products. Chicago 2 Ultrain

UNUBUAL homework opportunity flyth-aing augura for us. Men to men spara-tice (see to Toron 39 - flores) 3 III

PREE Booklet! "Mail Order Confiden-tial" Elson, Box 1831-D Parge, No. Dak.

START A Buying Service buy wholegale thousands nations is advertised or iddiscounts Postcard brings detain Amer-

FRANCHISE Opportunities nationwide Secure deta in Université y Nationa Pranch se Reports R 100 F20 M. Michigan Avenue, Chicago 11, Illinois.

\$44 PROM Square Foot Plyword Pigna's pressure Write Woodart, Bridgewater Write December 7 Massachusetts.

\$1.00 MAILORDER Item, Light Mailor Prospects Every Home Circulars Pur-nished Pres Gordon Products Box (MIA Byracuse) N Y

\$458 IN personalized baby record books. Sel by mail. Eleven thousand new pros-pects daily Use same literature we do No-Co-Ro Oukland 5-P California

MAKE Money Clipping Wanted Items from Your newspaper for publishers! Some with up to \$26 each! Write for in remat to Newscraft P hashers F6-963 E Man Courbus 5 Octo

COLORGIAZED Cuncrete pol'ery made w thost m da Paterred method Ceme-tery produc a novelties, tiles. Basement tent sen ig Mories making prijects jook get details free liten only Na onal Pot-terion Caranti Rapain. Mincrosita

PHEE Po to describing \$45 000 true limited Vacu inch P at No call saning Works the ! home Even Job May Pure Pill Carrehad Ca f

SAVE 26% to 50% on your purchases's Nationally advertised merchand or 3, or ; trated catalog \$1.00 postpaté Rece te m mediately \$2.00 cert ficate ressemble first order Meertier Bases Co. Bus 2161 E. Cin. Cinhali 1 Onio

WANTED qualified men to be our fac-tory agenta. Unlimited opportunities pres tire independence, financial success France Introducing the famous waters from a tore. Make space the work \$1000.00 monthly When dealer was hed make \$1000 00 weekly and up. Detains on request.
Don't delay Territories limited. Scientific
Electric Co., Box 2162 ED. Cleveland 5 O

IMPORTED Oriental Tropical and Eu-Popeun Curios Who esait. Entremely strategy and mysterious tema or a ftamps come for etc. Fee Bata Temple 1800 Green-word fronton New Jersey

PATENTED Mos. Turn discarded tires into bous to fi nor receptac es fire un usual Wer-dusar opportunities Details log Tirecraft Box 178-A R-3 Plant City Plorule.

START your own profitable merchandising husiness Cap la saperience unnecentery No merchanding investment, 4,000 famous brand name products everybody Your num name talang Free deto a Deperal Who seelers P Concept dan Prancucu Ca Hornia

\$24 500 SALES IN LWO WORKS, WHISTON Padio-mail order method. Free details. Broadcast Bervice, 1412-Z Great Morthern. Building Chicago 4 11.

BECOME an Income Tax Consultant Part time Tax Kaperts sain to \$20 at hour fur his your y season plus \$2 000 El 600 ennually uperalists monthly Yes Berries for business. We train you and help you get started, Literature free, Union Institute Lakewood 1-L. New Jersey

SFIL To Women By Mail From Your Home Recest Order Merchandse Every thing Furnished. Big Profits, Mohawk 21B Second Amsterdam, New York Mohawk

BUY it wholesale, Manufacturers Distributors. Over \$50,000 stems. Lateralure free, O. Seil, 1231-B East Third St. Duiuth ! Gardens M Pracuck Side El Monte Ca d Minagenta.

START Venetian Blind Laundry Prof. | our market. Positively no selling. Birds on lifetime business New machine instructions furnished. Sational Aviation, ee book et PD Co 642 F Set-sec Box 4097-5, San Diego 4. California Pre book et PD Cu 442 H Bet-eca Wichita 12 Kansas

BUY wholesale direct nations ly advertheed libes Seil of discount 1 000 famous brand Watches Appliances Giftware to homes organization Amaring profits From Wholesale Idea" National Supers Service 12:4FE Capitol, Mouston Texas

Michigan and greate est doughnate flart in hitchen. He smoke Sell stores Pres recipes S. Ray Co. 2005 South 15 Ave. Minnespole 1 M na

DO It with "Floating-Henryburgers. Over hill ion sold 1953 state type of place operating or occupation. "P-H dystems, Box 816, Wighlits, Kazuma.

MONEYMAKING

Mill Titanis gems, 10 15 carat wholemie More by Riant than Dismonds. From
PRINTING and Office Supplies WholePLASTIC Shorts Rods, Tubes etc. Proc
Salaby'ns. Dismonths. 1401 5 M tybe! One- 20 026 Home. Logistating first Royal. Last. Plastic Supply So. 2001 M firm.

DETECTIVES Harn May Meney. Experionce unnecessary Detective Particulars free, Wagoner P-126 West 86th, N Y. 36.

SPARETIME Profits Taking Subscrip-tions A. Magazines Wholesan Catalog Prof Cameli Agency Westfield | H. J.

1940 DEPRESSION forced the le invent my awn has sens a mit mum cost highpatent al name manager Lucay des et paid immediately over \$1 000 every me a mince. Over half net. This original des er "Selective Manlorder" is United Blaces "Selective Majorder" is United Plates Postal Service approved Now mapped out to guide mailorder operators. Literature iree, Eveningshade Ranch, Belotes 15

PREE 30] Prifitable Small Busi-Hornet Start Sparetime! Designant Surveys Kenmore 21-8. New York

WIN contest money General Contest Bulletin gives hundreds of tips. Lists cur rent contests and rules Sample 25c General Contests, 1808-A East 5th, Duinth, Minnester, Minnesota.

ADDRESS Advertising Postcards, Must have good handwriting. Box Nine, Watertown. Mass.

NEW 7"x11" Ditra Blue Signa Te retail Mr. Samole I've Lowy 5.2 Broadway Dept. 802 New York I

\$15 WEEKLY addressing unvelopes. In-Boring Valley 36 New York Adaptive

MOROCCAN leather products direct from exporter agents wanted Interafric Moriggi

MAKE Money At Home as renewal headquarters for all magnitives Liberal communication. No experience his rap all needed. Supplies furtished. Write for Free Cutume McOres a Magnitic Agency Double app. Mount Morris I those

MEED Extra Money, New plan No inrestment Sparetime Sample details free Transamerican Dept. 63 Bus \$15 Alianta

EASLIS to \$60.00 daily while traveling Travel anywhere Ho meret andies to set Proven successful Complete gratituctions \$2.00 Traveler Box 1'5 Longview Wash

PREE! Benseltunat Money Making Ideas! Buyer 65 Uptown, Hoboken, M. J.

MILLIONS In Ideas, 20s, Enterprises, P-134 S Wabsah Reg. 1, Chicago 4, 111.

MANUPACTURE Shinestone and Pearl John ry at home Latest creations treme does profit 5 Bu of needed Fosteard by risk is ustra ed catalog of sett at stones sig A V test Cu Inc 2:6 M Prin Ave New York at New York

MUNRY found the our agent in your mir de proctry etc at who could price Amering profits Experience unicecessary for dury Free catalog Zerah fir there 662 Mission Street, Dept. 361, San Francisco S Cauternia.

PREE Wholesage Catalog Make Up To 500 - Profit More tire gifts promiuma contume prestry west watches housewarm name brand merchandse No juril ten to storm or main data Write for Catalog No. 2 PS 7. How h Des ribiting Company 300 Brandway Macon Gourge.

EARN to \$2300 monthly as our mannahed Experience unnecessary. Complete instructions and sample \$1 00. Der Craft, Sox 268 Mouroe, Washington.

WARM \$160 month, easy breeding hybrid eatthworms, spare time. Big new demand. No expenses. Get in on ground floor now te for free Mormat on Barthwirm

MAKE Big Money Rulaing Paralisets for

EXCEPTIONALLY Profitable Nome Mull-der Businese Plant. Lewis Bartisti Richland Georgia.

FREE Wholesale price information Nationally advertised merchanding Speedway Box 5304 Indianapolis L Indiana.

MAKE to \$4.50 hour doing common per lettering. National Artists, 50:15-C Borth Marsalis, Dallas 5, Texas.

OROW Mushrooms. Cetter shed and suitours. Spare ful. time year round We pay \$3 to it. We paid Subbitt \$4.45 00 in less works. Pro Book Washington Mush-room Ind. Dept. 179 2004 Admiral Was Beattle Washington

WHOLESALE Directory Mallorder Course 152 (a.ue) Mr (coto) Flord & \$15 Stage Vice Platte Louisiana.

EARN Money Evenings, copying and dup cating comic cars as a for advertisers. Adservice. Argyle 2, Wisconsin.

START A Buying Service, buy wholesale thousands hallor any advertised products. Moke but profit a sell, g at at rable discounts. For card brings details. American Buyers. 630 T Linden. Buffala N. E.

PICE Book 505 Odd Successful Bush-besons Work Home Payers acmesting Odd! Pacific IIC Oreanside Cauf

TRIPLE your profits. Let me write your taies letters and catalog Advice free Window durie 635-B 4868 Marine Drive Chicago

\$200 MONTH! Y Post ble Raisins Ent'hnorms Backward Garage Basement Computer ! unrated Bookiet explains tax is teeding packing marketing 25e per paid O.ark Worm Parm-V Willow Springs. Missouri.

MAKE money at home. Write. Falcon House Winnebage 4, Illinois.

PREE Priso deser bing \$45 808 Dis-\$45 son Unismised Vacations P an He carriaging ma sorder merchand so equipment I as known Works stand home Knop job. Hay regerfil Curastant Ca of

CAN You Earn 500 Workly addressing Disk of Folders? Enclose stamped ad dressed envelope; write Allen Co., Warsaw Indiana.

ADDRESS Envelopes at Home Spare Time \$50.00 Thousand — Details — \$0c. Pisher's, \$213-Z Musion, San Francisco Car wha

START your own name brand business Buy wholesale direct Appliances, Watches Homewares Citiwares. No investment or inventory. Your own name catalog Proswith everywhere. Free details, General wholesaiers, P.O. Box 1658PO San Pranessee. California.

ABILITY to Influence People tests neuros 100 pages aida \$, 10 Pra chines numunbie Waist of Purch ingica, Pute tathens . 1000 Francey Detroit 27 Mach and.

840 PER day \$1 brings details. Ken.

BUY who weale direct 4 000 guaranteed brozal new passer a p advertised. House, unter Watches Catorina Bior' og Ouida O Hears Ca a g 250, Wholesalers Mart P U Bou 6-22FU Houston, Texas,

First Rk Security! Learn Watch-Clock Repairing at home. Inquire, Modern Lech-nets. Supply 55 PB West that Street Mem Yeth 36

Wholesulet 30-80% discounts Large Calning of Nationally Advertises
Color Appliances Walles Jenery Camgras, Typewriters. Tools, Kickenware
etc. Start your own business. Details free
Constanted Dutributars. But 1837V,
Paterson New Jersey

EARM Cash At Home Spare time. Guide To Home Extraing folder describes over 35 money-making hebbies, \$1 Mrs. Sutton, 3105 Haisted Road, Rockford, II).

FORMI LAS, PLANS, ETC.

PORMULAN A. Ribes Lauret products Literature free. Kemico, Park R.dge 15 Ill.

LATEST modern real manufacturing formulas, list free Moon, Marivalle, NY

REAL Manufacturing Pormules Lipts Pres. Cumming. Chemist, Gordon Avenue. Syracuse 4 New York

PREE Formula Calalog Anything analyzed \$25.00 Western Chemical Salem, Ore

23 MONEY-Making formulas that you can sell for profit, send \$1.00. Formulat.

MILLER'S modern manufacturing forbruies make fast selling products that get the business and pay) Pifty years supplying the best. Late literature free! comb Me ler chemist Tampe Piorida

PLANTIUM

PLEXICLAS, Lucita. Any sine sheets. Square foot (12x12) cost, 1/16", \$t 18, 16", \$1.56; \$4", \$2.26. Add 12% for postage. Minimum order \$3.00, Alman Planters 600 Broadway New York City.

PLASTICS home-craft course for Men and Women. Te is and shows how to make bundreds of fast sering plastics products. All publics and materials for 13 projects included in course No special lands seeded Course pays for itself Write for Free bookers interptate Training Services, Dept. 22 G. Portland 13 Oragon.

PLEXIGLAS shows out to suo clear all thacks some standard outdoor trans-But 1668 Haberter Pa.

PIRERGLAS. Polyester 1-textglas, Acc. | JOSS New Salling Great Labor. Start tate Virgi is Casting costing plastics 8225-00 month plus from board Minimum Fast service best prices Catalog for 16 yrs Fast information \$1.00 Greening. | Ocm-O'-Lite Sex 66637 North Hodywood. | Box 663, Two Harbors, Minimum. Ca afuenza

Pinguolas resin malerials fortigeel In our rubiquete punt ca catalogue Van Hurt Plantum 1908 Digerman Des Maines

41 CHEMICALS & APPARATUS

NEW Idea Chemical and Apparatus Outfits for Home Experimenting Photo-Scales Migroscopes, Chemicals, Biological and Laboratory Supplies in Sina. Quantities Cataing the Estab shad 1972. John M. Winn 124-B.West 23rd Screet. New York N.Y.

AMAZING New Book of Setence, Experimonta Pormulas and catalogue of Laborathey Supplies. Only the Name at Scientific Co., Dept. PS7 2304 W North Ave. Chicago 67 Librosis

itt LATRATED Colony Chemistry informacy bookey Mc Trees Labora-futute Execution Island

CHAMICALS and apparatus for miles-(rise and pixes and price a shift aries Catana Sie Dept M M H was a hup;)
Co. 170 Mt Hope Ave Ructes et M N Y

MELP WANTED

POREION & Latin American Employment 19.4 Privago Reva & Directory gives Up To-M taste Parts in M 447 & Cost on Const. or ton (1) eit an Conet je ign ift vor meit Inbe Many Off the ups Aviation Trains the teat Seemed plies of the Trains the Exporters. How-When-Where to Apply the restors forms. His Last Firms Bases 11:00 postspand. Onebest Reports. But 16: 8 R. 1 mond 20 Canal.

ALANKA'I Last American Frontier at 100 bet an 1954 Business Direct ey & Occeptment Map Mistary & Civilian C a ruction H meetred & Hahvar forts Mr of Aviation Pur Parinting Graces Timber Travel directors List & Pema h rang 2000 t ap. F A asks (reportunist

ADDRESS Advertising Postcards, Must.

ALASKA, Pacific Par & Middle East 8300 to \$1500 month Job List firms new hiring \$1.00 Pacific Service. Bus. 115 Septile 2 Washington

PONEIGH U.S. Job Last So. America. A'asta Spain Europe Pure Paul con a John Open U.S. to \$ 6 mm Trades Office U.s. to d. Skind Rend Stam and self-addressed nor Job Opportunities Wassen

JOSE In U.S.A. Construction skilled to 64 12 hourty Carpenters \$3.55 Limits elans \$3.60 "abovers \$2.00 Civil agreem opening & \$3.50 Limits opening & \$3.600 E \$ \$000 event v Labor \$100 tasks \$700 Library to the second opening \$1.00 tasks \$1.00 tasks

MEN Wanted New for Pareign Conteature tion employment on American Bases in E rape firm h America Far N cin and other countries Truck Drivers \$3 35 hour Clerks \$2.00 hour Curpenters \$3.20 hour Laborers \$3.00 hour Many other trades wanted with wage rate accordingly by to To hour week with two and one half for all nort 60 hours Transportation paid it to 24 might schitzer? A so jobs with Ship Oil Mining Aviation Films and complete the larger cities Full information of all films between these Full information of all films between these Charges and the carges cities Full information of all films between these Charges and the carges and the carges are the carges are the carges are the carges are carges and the carges are carges Firms hiring, jobs open, wage rate, sem-ble contract medical evant nation appli-mation form etc. Air matted to you for nn y \$2.06 Pureign Construction Busiette. P.O. Box 363 Dept. 26 Dames Trans

\$245 PER Week prerpess' Clerks Much dr ters, cooks monstructive men guarda price workers laborers, carpenters, electricians. mechanics, empireers, teachers factory workers, many other classifications. No experience needed, some jobs, 351 projects, 51 countries. Plus latest b., rim. Pirms Secking Applicants Complete in-formation, illustrated, 56 pages, applica-tions \$1 Johnsey to D-1 Sun 36 Bintega Montaba.

\$1300 MONTHLY for truck drivers, \$1400 monthly for entpenders, ejectri-ciana plumbers mechanica \$1300 for everts and apporers Reparement hirting how bring done Pull intermation and complete foreign listings, with current in-formation on Spain Kerts Australia Alaska & Canada \$1.00 25.000 fore and bearing accided for new states in project! Complete information and effer domestic Hatings, \$1 00. Dept. 4-G Opportunition Unlimited, 1110 Commerce Bidg , St. Paul. Miznesots.

ATTENTION Construction Men ("
ch Drivers-Carpet sets Meth ness -Truck Electricians Clerks Functions Labority Electropists Supervisors Many Others Latest Copyrighted Reports on the to contact for his lest paying jobs in ever all counts one. Inc uding U.S. South, South America, Alaska, Europe, Africa, etc. Pay up to \$1550 00 morths Transportation paid, throme tax relief adverture travel overtime, many other advantages. One rear registration and advancey service Applies we forms. Only service with uneon di suba, monter-beck guarature of sa in-faction Introducts service A I only \$7.00 Amount, \$2.25 DOD's accepted) Inter-national Reporter Sea 1047 &E St. Louis M. annuill

EANSAS City tries for skilled unshit of total Help Wanted or are as air

CANADIAN Opportunt tes Read Mont-rest. Toronto dallies—61 80 each. McHugh, | Bun 660 S e Aga he des Morts F Q

EMPLUSMENT SERVICES

CONSTRUCTION July Last Published Monthly \$. 00 Demputer a Countractum Broad News Dept 200 PS-1 Bridgipurt. In fourth

PONFIGH John Contracts underway and near starting in Africa South America Carada & grand Parope South Pacific Michigan and A aga Send \$1.00 for foreign job news, information applies ion for a ste DCS Pareign Job News Dept 200 PS 2 Bridgepost In

CYRRAFAS Jobs By pay transporta-tion expenses Corrical profess size, me-chanical sorters Most and trades La est Johnst station industry substruction, manufacturing ad follopation guives ment agencies many state of purturities Up to date ir formation on coruring or a loyment contracts scrotter tax applica son forms La centre ladana

AGENTS WASTED 43

ACIENTS 3005 profit colling genuine poid window letters stores and offices ? ee suring see Mous lie Sign Latter Ou. U. E North Clark Chicago

START Tout Own Business on gredit. T or we have 1456 of our Doubers and 26 and to 82 hos n 1863. We may be stocke dust piment on credit 200 home necessi sed So to experie to an occasary Pract to pr Stable business backed by wind under the duster Write Rawleight Dopt Q J. Pot Prespect Li

MEW Jobs open in setting Send name address for five free leaves of Opportunity Magazine's money-making quide listing its deeds of somparies who is pay for me I full or part time. He experience needed Opportuity 26 E Jackman 1964 18 Chicago 4 Justicia

MAKE \$327 20 A Month even if you take onto four orders a day I is amarine new Presto Make Indicator Pile any reintigerator Sella itself in seconds We to for free sales kit. Merilie Industries Dept. PD 87C 114 East 31 atreet New York 10

ABSOLUTELY Frap Sales Kit Youts for the saking. Send postcard today requesting til showing new line both buckess with your name or presided for-lians any badges obvice ross & Factor on boths. Write Rock Past. Box 1436Pt. Previdence R. I.

OULD or filter letters numbers Wis-LAGORE L'EUGRA its Prov Sampins. Atlan-U 344 West 19th. Chicago 20

In \$210 a work worth a postcard to you" Then rush eard with name and address for special free Tries F an that soils are ing DAY Automatic Refrigerator Deliverata its but cutes" Write to Mr. Lawin D Front C-Matte Corp. Dept. P-163 173 W Madison Chicago S Luinois.

ADDRESS Advertising Postcards, Must have good handwriting Best Hine, Wedgetonn Mass.

GOOD man oak make \$2 600 next \$6 days. Every house in town wants amounted Milité glowing curbaide numbers Auto-malie free trial plan pays profits day after day Wette for free details Milite 173 W Madison Dept 202 Chicago 2 Lil

HAVE a sumplete store in your porket. Buy wholesale and make big profits Bend for free general merchanduse catalog how Jay Norras Dupl. Pft. 445 Browne St. New

NEW Plastic Monding Tape, Just press

MOPRY for Ematt Make 830 and more foring spare time Priends neighbors weryone buys from Emris enquit to New
Sparkling Lime. Imprinted (Thristmas
Cards for As Little as Se Persons used
Statemery Naph as Large Cit Wrappings with Pres seconsories. R blum Ties
ad 876 quality Money Saving Values.
For Proprience Needed Sand Name and

Address for Pror Portfolios Catalog meriments on Approvat Bonus Plan ID-mile's "Portable Cult Shop Makes Money Piret Day Write Tiday Emira Gree of Care Co Dout C 203 Emira New York

IT's as terrific you'll actually sell Thousunds! Braud new \$7.56 pucket check protector bales pouring in A treme doug dea 'er you Get your tewn today Pederal Products Expheton at 21 inole

MAN to earn \$160 up per week Long Reeded merricon Advertised worldwide Prosperts everywhere Full of part time Excurrer No Investment Free me of tamp of Write Red Comet. Inc Dept. 390 L. Littleton Colorado

LEARN where he some in profits from While saids have guite. Hereive free proven sales course and whole story of how you can get these profits Also free catalogue of six of the world's Brest Microcco Orale Gen, he Leather covered Situes and related dring Joseph W Cain Who:

CHRISTMAS Cards pay 75c profit on \$1.75 cannote ent Exchange 40 for \$1 Mame new fast se seen Cash testus 5 Assort ments on approval Cardinal 2000 State Dept 80 K Eticsmatt 14

NAVE Make Big Money in Sparetime Buy nationally advertised corresponding the national of the control of the A Sales 18 Ph Unit Terrace Heaburgh H T

PRAE Sales K t contains everything you need to start making as high as \$ 300 a month with amotory new Propin fire ex-tir suches: We to to Merito Industries thept and the Enet 32 Street New York to Hew York

ACPRITS Spiesmen fie'l beautiful hand solored breath colorgements and sectortion at new persons and photo comparts est un benedita locketa atc Esperience u merekany 40 advance comics especa We do ver velock Westerbus and the petter full time. Pres sample outfit Novel Portrait Co. 2342 North Ave. Chicago. Ill

NATIONALLY advertised appliance continues dismunds trained type arriers etc. Wholesale estated for J. J. David Co., M. E. Englewood Avenue Englewood New Jermy

NEW Nathruom Deud-steer Hangs on wall Bantahen adort bathroom a serion

E shined seller Bumpon next on trail
Er mee 36 Akron Colon
WAKE 550 975 \$100 again and again?
Entre money so the life by Chris mas
As Occasion a setting on the Big profits
plast satts cosh burnet. Write for Frequer amortiments on approval free agained Survey Invitated Universities Corde Survey from succes Cura on Selecte Guide New England Art Publishers North Abilityten 732 A. Mass

B H a Boure sime Greeting Card and Ouft Strop at boms Shen friende sam, so of our new 1954 three mas and At Occation Overling Cards Take their orders and team up to 188% profit. No experience hereasty Costs nothing to try Write to-day for temperature on a sense. Reps. Greetsigs Doot it Periodate Michigab

OPERATE Esculator Matterder Aystem on his our products or any p. inducts. Write Belleyou Locator 2.V 1/1904

EXTRA Minney Every Work 1 if actid you fac. other Built household products on Pres Trial Show them to friends and southbors. You can make hig Extra Profite Write Ringe Dopt bont?-1 Lymphings Targlesa.

AT Last! Something New and Sensationni in Christman Carde, Make Extra Money Past' Show Salina Yeangta Melanca Orts Baar Orders Pays up to 180 . each profit 30 Fron Sampire With name in for 1) M Big line Amazing new Oritter Brite Ornamenta Hapkins, Offita Stationery Briefal \$1.00 Boxes on approval Pure Orestings 2003 Locuel Dept. 643-J 84. Louis Mr.

WHOLERALE Catalog' Stock bottom prices Nationally advertised appliances traiches Eppeuriters aumeras toxic lays brusewarte printegraphs. Consolidated Dr. ributers. Box 15778. Paterson Res Jersey.

CALIFORNIA sweet uncling brade sensati and separa Purtheusars area Managin, 2026P West Pier Los Angries & Chill

ANTONE Can Bell famous Roover Uniforms for bunkly phops traitresses burnes, doctors, others all pepp'ar miracle fabfice -explosi distress. cut Jupille Exclus. re MELF Wanteds, next for ade normalist prior. Samples and on Mail Bridge 21 cres faints Equipment from Harrest. styles, top quality Big mah thouse now

BIOGER Profits selling Greeting Cards -Oct 121 of sensatio at Pactory Surplus Bargains \$1.75 boxes for 50c. \$1 boxes for 25c w the they last Hig am new 1854. Christmas Cardy Status ery O to Aspur Free M dwgs Cards 11.7 Washing-

BLOUSES, lingerie, hostery brand new line. Sensational new money making plan. Write. American Mills, Dept. 426 Indian-

60% PROFIT on Cosmettes-Why make less? Pamous nationally advertised Studio Ourt Hollywood Cosmetics pays 60%; Make 625 day up! Hira others. Write or wire for free aumylies de a s. Stidas (e.f.). Oien-daie Caf. Dept. Ph. 24

BALLMMYN Put yeared is like for by makes her foruse Kee, of ret so , sed a hise fine for the St St randed neverthal dise. Ma intra a advert ed I plan a fit the and merchants I bern) dess bus it as es flideling or full the W. da Producta, Dept. 43 R. Spet er Irdia a

BAVE 56 15 On her et id applia tra Pres Blacklings P. N. & orticle, New Jersey

TE NEX LIFEBOOK with threaders \$7.30 gross II piece plastic Chr a mas deccratpa be Mary sam, do & cala of 8 of Mile Barta In West Zied Ht eet haw York

BiG Money making opportunity Excluabirta, coveralla, Advertising embroidered, Every business prospect Outfit Pree Mas-ter Div 363 Water Ligonier, Indiana

RUMMER Catalone. Lawrencery (40% eff.) Seil dealers, Prepaid, Terms, Rota-

SELL direct And Through Desiers. Best concrete sealer and decorator Extra profit on small contract jobs Rez Acuadry 5511 W North Avenue Chicago, Illinois.

BLAUgabbl beather Pictures Profit Prev salupie Apartado 9036 Met-

MAKE Money Introducing World's cut-est children's dresses. Big sejection, ador-tive Aush name. Harford. Dept. M-1301. Cinclo satt 25, Ot to

BENBATIONAL Insect-O-1 its destroys inserts by he har to a chem can with heat | of electric by he by State a lot \$4.95 | for a profit for Agents Traces O Lite Co.

EARY Extra frence-to Sensational Hen adjuste Broch He start Izona & Bensational Board Core Ord Housekeeping Approved Terring & 60 as or He 6 for Presponding to Service Broch Bangas cover \$1.00 Mercy Products Dept X PO Hon 421, Matteria Harris Services York 18 Bt Y

EASY handwork makes fast-selling vocful artir en Samuel tre hundrade Com-

BUY Wholesale thousands nationally advertised products at his discount Free Wholeshie Plan. American Burne. 229-T Linden Buffulo, New York

Bid Money Now-with primitional new product that will puncture proof auto and truck tires in minutes! Amazing dem-enstration, Every motorist needs, wants, have Write for money-making details. E what thest B-11 Companies Bidg. Chicago 4, Illinois,

PREE hook '505 Odd, Successful Busi-berres Work have Esper, something Odd Pac r J&C Oceanside Co.

MAKE Extra Money Sell front door name plates to friends, neighbors. Retail \$1.00-you make \$1.00! Free selling hit. Modern Engraving Co., P.O. Box 184, Souton 14. Mass.

MAN Money! Miracle Spray-A-Tint tinta windshierde diren mafterous glareprotection plus hen 1054 took. Sprays on in 1177 Reduces giare from sun, and break in 1177 Reduces giare from sun, and break in the for years. Auto, truck unners buy on sight Prollie 100% to Horar A Tint Dept Pd-6 Containers if de Chicago t I I as

PRSE Posts deser beng \$45 800 Unma order merchanism equipment, Un-known Works their home Keep Joh. Ray tegs-Ph Carabad Cand

AGENTS-New revolutionary mass martet safety auto accessory Big profits-No competition. Low proved Terry rice open Parnat Machine W ras 1819 V se Atenue Dept. PS-T. New York 69 N. Y

\$1 00 PROFIT selling \$2.95 photo enjargement offer Allen Studio, Reigier B dg , Little Rock Arkansas.

BONUS Plan. Wholesale catalog Apt sances comeras us her etc Pette Company 1554 Wast 11th Street, Brooklyn 4. New York.

SFI I \$50 pertable air burd to er Revolutionary new United States patent, High commission. Write Contemporary, 326 East 36th St. New York 16. N

\$18.000 PROPTT Selling Printing Matches Poecia 3001 Arrow desier e is bow be did it in giant free a et out? 1 Year out do it too milhout expens re Wilte Arrow Press 121 A Fourth Are So. heart & M. revita-

HIGH-GRADE SALESMEN

ADVER 197NO high matches Cash in on his demaid of the Calling late, ma ches. Cuts I that, bustranes and is literal parprices privet in guaranteet on repeat orders. Cast c some visual Superior March. Co. Dept. P-784 7530 Greenwood, Chicago

AD Matchiel Sell Amazine Descent-20 50 60 and 240 tight hook matches. If arest spot cash comm assure every best-ness a prospect. Low prices for high qual-site. Research Frank William High Sub-ing! Bales all for abod Match Corp. Dept. Ph. 53. (Bucago 32.2.1.1.2)

EXCLUSIVE Contrated many grand ad-We see Commonly base In mediate as the hand to State qua-Page President Aver att Pub. at 4 Fagt Co. 79 Madinis

EDLI ATIONAL & INSTRUCTION

BOOKKIFFFRS Incidate your earnings Operate 5 at own a mol. wd. 1002-let 4-Week" Bookkeeping and Tax Serv-ce Full or spare time Details Free No obligation 21 is But 201 Cedar Grave. North Carolina

Correspondence Courses and Bir hi mild and rented bluten burk graz-actes Catalog free (Cartes Bought) Los Mest ain Pissah Alabara

WANT A Diesel Joh? New Opportunities to increase income Higher Pay, Mure

ties to increase income Histor Pay Mure Mirey We can help you Qualit Took and possess the terms of the terms lilinois.

pig a Real Estate Briter Study at home Wille for Free Built today G I Approved Weaver School of Heal Estate. 30t Law Bide Kansas City Mo.

MIGH School diploms at home. Licensed teachers. Approved materials, Southern States Academy Box 144 PX. Station E. Southern A situ for all

INCREDIBLE Breake Mental Super-man Overnabl! Pres Broket Stion Box 1737-VM Hollywood 28. California

STUDY by correspondence for Doctor's degree in Parchology Metaphistics and Leminity College of Divine Metaphysics. Dept. P.B. 2811 No. Illinois Street, Indianapoint & Louis in

Mairit al Laboratory Technicions in great section. We train you in your own home Unicopus tree Imperial Technical Institute But \$75 B Austin Trans.

PLANO Turing Pays Learn this profitable or free on at home couly with patmusic necessary D places music necessary Write for street Tonometer and mecha ical aids. No granted. Veteran approved. Write for booklet. Nile. Bryant School, 2731 Stockton Blvd., Dept. S. Sarramente 20 Calif.

BIRPP Learning Learn anguages aryth or spikes. A l while alless it untrated builties teles extending results how to make device chempty.) Price (2.16) Siern-Learning Research Association, 114 & 10th Averue Omara Bebraaku.

EARN course degree Remain employed. Premant Co. cgv \$15-4, Grand View, Los Absount & Carl

INDIVIDUALIZED instruction in mathe-Balk topics offer a root latter a determs at the cap a process and quadra se equations. Do a a free. Miles Doney. 2554. Worth 8th of ree. Managing 6. Wilconsis.

WELDING training pays at Hobert Welding School, Box F-741, Troy Obio VA Contract. Best equipment, Catalog Free.

HECCIME a Doctor of Parch car of Me at thick Laur secret of causes ment, happened Win ded en of Parl or McD & e meetal worres Free book College of Universal Truth, \$638-10 Broadway Chicago.

GOVERNMENT Position? Rome training for Examination, 39 35—Refunded if you don't pass Write Overert It's run-tions 2"-Cd-Ben 565 \$4 Longs Managet

SIMPLIFIED method teaches algebra for an or \$1 quarter end Zimubon, 4123 Orchard Dearborn Michigal.

POUBLE rour pay with a College Four roor Dip' ma. Cramwes Institute Adams 7. Mass

WANT Us Gurt Joh' Men Women. 10-55. Start high as \$60.00 week. Quality Now! 23 000 jobs open Experience often ut receivery Ge: Pres W page book show it a jobn buintien requirements son pie R-22. Ruchester New York

SPANISH course (15 year), \$5. Marino.

PHYRICAL Therapy and Message We train you at home Earn begut? a from your OWB private practice or work w h h upilia a and doctors. Free cate of se freste ato Desk I sasse, Marridan R .4 Chicago 40. Iltinota

MEDICAL Laboratory Technique, Learn at home. Cutalog free Century College, 8 East Ohio. Chicago 13 Illinois

ExRY While You I carn A sto A d Dreset Mechanics Master this top part in frade Ma y graduates marn \$100 a week and up-A round for K roun neterans. For tree is ma ion write Dept. No. 342 Manh-ville Auto-Disse. Callege Math. 16 3 Tenn.

PRES Is the study course in basic ecoment on inferred so a pub is service [second-ment ded by many leaders for d postcard in a may sto information lienty George 5 t er mu eta informazion Si hai i beret. Bi fil E di To han' Everyl, P. 56 E. 66th Street, New Y h Ti New York

OROW Muchroness Cellar shed, and out'd see Spale for time year round We pay 83 to in We paid Nathert \$4.45.00 in few weeks. Free Book We a return Majorett I d Elect 100 2054 Admiral Way See Tie Wast region

FDI CATIONAL Bushs correspondence courses brught sold rented Free Catalog W1 ard Barlen 213 Easts. Machinilog Wi ard Bur

MIRACLES via Subconscious Control. Free Autodynamic Brochers. Sec. 647. Ocean Park Calif.

PRESE Bible Correspondence Course Worldwide, Harmer, Masterary Institute Wildwood, Georgia,

RECOGNIZED College therees through home study Tabos Colleges Son 913 Reng. Nevada

DISPLAYS In Miniature, Bu of exact new e r television abida civar projects p due de più saje a minde w discusto be divente en centre e sean bise pair's to open on its prespective 36 years on serior of Bag year Be over bons With at its house \$1.00 open meet beings lat branco free Address Ministures. Bux 731 Ba ie Creek M. igan

CONTESTS

SURFRISES Galorelli Fabulous Borne freedow Ouporthrosty Long established contest hide in Send stamp National Contest. Bu give Box 2685 PS Mismi 16 Plor de.

DETECTIVES

DETECTIVES- Work home- Travel Eseriance undecessary Deter to Particulars on Write, Wagoner P-136 West 66th, New York 34

INVESTIGATOR Training. Experience minecessary Many opports the Send for Free particulars Free creder talk Exchange forcet Service System, 4300 Broadway. Chicago 13 Lilinota.

DETECTIVE Training Philips Secret Service System, 1917-C Sorth Esmoeth, Chicago 20 III.

NUMBERS SERVICE. INTURNATION, NAME LISTS

MAIL 1903 Lists most any classification.

1000 ames \$5.00 1000 your circulars

mailed and mailed \$12 to Wrig Lists

Mailers, King North Carolina

Pict 49 ma ing lute distractord Opportunity scekers, mail buyers births brides. Other classifications from our own files. Willard s. Box 815. Atlanta 1, Ga

41 SPECIAL SERVICES

REMAILING 2-c set 4 stamp offer services E sand 2301 h W 4th Avenue Mami. Florida

LETTERS Remailed from N V C 25c each 0 postcards 6 up Van Buren 82 30 Ma > 6 res Pears Barr New York

M ATTHORS SERVICE

BEGINNING Writers, Oct 33 to 320 cheeks do to write a character fraction of the distribution of the first and first first and first first and first first

NO hick fluiding a book publisher? Write for Free Booklet PS. Vantage Press 120 West Jist. New York

BOOK Manual pla Littled Coloperalive publishers since 1925. Mendor Press 224 Newbury St. Boston, Mass

ADVERTISING, AGENCIES, ETC., FOR ADVERTISERS

ADDRESS Advertising Posterids, Must have good handwriting. Box Nine, Watertown, Mass.

MAII order advertisers the the highest 25 million readers. Pres Booket, Dieser & Dorskind, 147 West 42nd, New York City 1148-2308

AL CARTOONING, MIGN PAINTING, CHALK TALIDA

CARTOONISTS Asserted Professional Prepare for Animation with Max Pielscher's plan. Write Vera Coleman. 66 East 42nd Street, New York, N. T

CHALK Talks. Laugh Producing Program, 41.06 Libertrated Catalog 10c. Cartons at Besta Outh et Warrens.

48 TYPEWRITERS & OFFICE MACHINES

TYPEWRITERA Printing Devices Of fice Machines supplies applications Districted Districted Research & Control of State Control

OFFICE RUPPLIES

FULL Esse three lines \$1.00. Adstamp.

ALL kinds, Complete 3-line kits \$1.25 Met. 1 lock s. 1 is 4. Haidridge Road. Size ver top or 8. Mary and

TOP Que ty I ju es \$1.00 R Swarthmit 1674 Reien, Carden City, Michigan.

2 LINES \$1 00 Past Service! Cutalogue. Johnson Press, Suz 4-B H Y C. 25.

MULTIGRAPHING, ETC.

RETTER printing reasonably parcel flampies Estimates. Write Reporter Charsea, Oklahoma.

JOB Printing Lette heads to see the City outs Printing 21 Barrier Portsession 's Virginia

BUSINESS, personal printing Samples free. Mclivains. Box 34-P, Brooklyn 30 New York

OFFRET printing \$6.66 tood \$3,5311 16 th National Letters, 1401 Broadway New York 36

M PRINTING OF TRIES.

DO your own printing. Save money Mak pie raint We is a revers I if P is for others; good profit. Raised printing like engraving too. Have home shoo. Details free Kelsey Presses V-5 Meriden Conn.

MAKE your own and molding rubber stamps and printing cuts. P. eurubber Argyle ? Wisconsin

PR VI'VO Presset Type %, pres 15 a Je. Turnburgh Service, Loysville, Penna PRESSES Supplies Subter Stamp Machines, Catalog 19c, Box 211-S, Springneed Missour's

O PATENT ATTORNEYS

C. A Snow & Co. 8-427 Snow Building. Washington 1 D C. Recistered Patent Autorneys Write for information

INVENTORS For Invention Record To the Carl Major Recovered Facts At a sy Was worth Building M.Y.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John Randough Registered Patent Attorney 207 Columbian Bidg. Washington 1 D.C.

REGISTERED Patent Attorner offere services Sanders, 6424 Evans, Chicago 37.

INVENTORS Learn how to protect your invention. Special booklet "Patent Guide for the Inventor" containing detailed informs her concerning patent protection and procedure together with "Record of Invention form will be promptly forwarded to you upon request—without obligation. We are regutered to practice before the U.S. Patent Office and prepared to serve you in the handling of your patent matters, Clarence A. O Brien & Ha vey Japobson. Resistered Patent Attorners a. F. O. Divinet National Building Washington D. C.

INVENTORS—If you believe you have no invention we can make a pre-minary search on pour invention and ad or you whether we dish it can be rated ted field by copy of our Pair it flowned. He was Project Your Invention and True, took flower of form No obsertion McM from flowers on I flow the results of the project of the pr

INVENTORS Bend today for booklet. The ellipsistent for larger to giving the animal policy of the control of the second present to the second part of the second part of the formation of the second policy of the second part of the second part

The a. ree on to but Branch Heart of the name of the Branch Heart Court of the Cour

PATENTS Inving L. McCuthran 2.6 McJaclien Side Washington I D G Regulated Patent Attaches

INVESTIGATE When you are not shed that you have freeting cometting of the security of the structure of the security of the sec

FOR INVESTORS

INVENTORS. For "Lavention Record form, contact Carl Miller Registered Pat-

INVESTORS field for free patent inlormation is it and investor's record flux rived. Patent Attorney. Associate his more Patent Office 1922-1929. Paged 5 forces de Advance Navy Department 1930-1967. Quetave Miller 64PMI Wartor in a fine Wast region 4 D. C.

1NVENTIONS Promoted Fatested or 1 rates ed fistable race 12.1 W to Adam 2 sher Company Mill Idaho St. Louis Mo 1

Paher Company 5411 Idaho St. Louis Mo |
INVENTORS: Without obligation, write
for information explaining the ateps you
of the take to me by a Patent on your
invention John Randoph Registered
Page 1 At order 196 Columbian B.4g
Walled m 1 D C

INVENTORS, if you have an invention for an e-pa e-ted of unpa e-ted write In-et are al American I issues Dept 20A. 431-E St. N.W., Washington 4. D. O.

INVENTORS Learn how to protect your juster two 5, we has broken. Pa et Clusde int the five for containing detailed a justifiation of newtong purent protection and procedure settler with Record of Itsertant form will be promptly form a ded to yet upon sentent with it shall not be at the practice because the U.S. Palest Office and prepared to serve you in he haddang of your part matters. Convice A. O. Brien & Harry Jacobson Registered Parent Alatings of the Alatings of the District National Builds for Washington D. C.

PATENT Searches, 45, including patent copies, 44 hour air mail service Invention protection forms free Patent drawings prepared Edward Abber, Warner Bidg Washington 4, D. C.

INVENTIBLE If you believe you have an invention we can make a pre-minary search on your fivetition and advise you whether we think it can be patented field for very of our Patent Banket if w to Protect Tour Invention" and "Invention Record" form No obligation, McMorrow, Berman & Davidson Registered Patent Attorneys, 143-A Victor Building, Washington 1, D. C.

INVENTIONAL If you consider your hyten and to be now hing at importance take steps to princet it with a Ir ted Ria as Patent with a trace the the right to exceed your most great great read read for inverse the control Patent Protection for Inventors' outlines steps to take to secure patent protection. Mailed promptly without obligation. Virtor J Evans & Co. Merlin M. Bvans. Registered Patent A torney will Mersin Bunding Washington 6 to 1

"INVENTOR'S Guide" and "Record of Invention" free on request Frank B. Ledermann. 134 Nassau Street, New York M. New York

MONEY from your ideas information free Grayland, 5313756 Grace, Chicago 41. DHAFTING Paret office drawings, Information free. Cumpbell 1637 Wolfe North Braddock Penna

WHAT is an Invention? You don't have to be too original to make money from Inventions. Details \$1.00. John Recly. 124-H Scenio Way Vallejo. Calif

PAPENT Searches 55 00 including patent r. sea Same veliable starch as conducted for patent attorneys. Free protection forms prompt efficient service. Patent Service Institute 945-B Pannsylvania Avenue Washington 4 D C.

CASH For your ideas, 200 Manufacturers need inventions, patented or unputented, List free, Invention Bureau, 200-6 Clinton, Oak Park Illinois.

BEARCHESS Put your parent searches in the bands of a Resistered Patent At-there in Agent as a spacing to give a worthwitte atentals by report Record of that he but take the request and it sermation to be patent protection Patrick D. Record Recorded Parent Attorney \$15 Controlled B. Managington I. D. C.

PALENT Bearet se prejuding copies of nearest patents 4: 06 Here at a remained with to 48 fearer M re Dian "5 reg stared paret attachers use my service For Free screening protection forms write M to Anti-Rantings, P.O. Box 176, Washington

PATRY! Searches \$5.00 48 hour service. Pres Record of lover ten. We to Harmold L. Smith Patent Searcher 422 Sheraton Build of Washington 5 to O

PAIN'S Secretion \$5.00 Mahour airmail service Recold / Constitut forms from Wite Paten Righters a Service 715 of a Street N.W., Washington & D.C.

II INVENTIONS WANTED

DELECTIONS maxing Patented supetested free ending Manufacturers help Could Marketing Service 1668 Michell, One and I Could

INVENTION'S promoted Patented or U: patented, Established 1911, Write Adam F: cer Company 5410 adales St Land Mo

INVENTORS, If your invention is adaptable to our business we will contract on cash of royalty If not we will try to place. Free bookiet, Reseler Sains Corporation, 77A. Premont, Ohio.

INVENTIBLE Buildreds of manufacture of have requested our areconnect to social to marketable new products. Complete to marketable new first to a of American Inventor on Dept. 800 631 & Street N.W. Warnington 4 D. C.

OTAHAN ENT promotes services Patented us a served sives size Pres par liceases Function live size 346 South Berry Peters Has Cast

INVENTIONS Wanted Patented or Patent ent Pending 23 years experience Promoting Inventions. Na social Merice Bureau J.22 Meramee St. Louis 16 Mu.

INVES ORS DON'T be your intention.

Pa en ed or Unpatented up you receive our offer arise Cough, Nov. 200 Marion O.

INVENTIONS Was of Patented Pending on y Inventors Patent Eschange. Harriotet C. 2

INVENTIONS Wanted Patented unputented. Send for free form "R." Others Adamed Patent Broker 3 Park Row H Y

PROMOTING inventions is our basiness. If it can be soid, we can sell it, inventers Research, 1164 M, Western, Hallywood, Charlotnia.

PATENTS FOR RALE

GARAGE door seal-wood, metal patent pending, Fred Beck, Gallitzin, Penna.

MANCFACTURING

SMALL Metal products made to speci-fications. Any quantity Walwood Frod-acts, Doster, Michigan

84 MODELS, MODEL SUPPLIES

SHIP and other scale models. Most com-plets line in New England K to Ct., gs. plant hooks tools, etc), es motors to as-trated catalog the James Blue & Co line Dept P584 342 Atanthic Ave Houtes 10 Mant

BITTP and pucht model fittings blue-prints Bend Die for inustrated extelog 220 lists v bundreds of Items A J. Picher 1993-2 Esoush Ave Royal Oak. Maga faile

SEND 10c Hinstrated railroad catalog, HO.-O, and S. Selley 746 Clay Winter Park, Plorida

PANOUS German Pleischman Steam-Englise \$5.06 to \$45.08 & mechanical at pa The to \$45.00 postunid Catalog life Mello Cumpany 30-18.00 Street. Eim-burst 78. New York

SHIP Models Ltd. Kits Pittings, Plans, Stuart Turner Steam Engine Castings, 1956 Caleing Ste Bit 23h Andorer Mass

1956 CAR models 1 26 scale all metal, chrome trim Soud for estatog Care & Hobbies, Dept. PS-18, 2333 Maddon.

NOME CRAFTSMAN

TOPS in everything for Leatherwraft, Lewest priors Genuine Crafton, stamps Catalog and Crawn Leather Company, 22 Spruce Breek New York M.

TRATHER touts lacing supplies From Onland National Mandstraft, 180 William St. New York T.

PRACTICAL Punting Word Pinish-ng shows how to get professiones results. Purntture fir shing workshop projects bome depret in Complete Modern brush at a proy methods Tricks you've never seen Write Home Craftsman. 116-P Worth St. N. Y. 15

PLANTICS home-craft course for Men and Women Te is and shows how to make hundreds of fast selling plastics products. All plastics and materials for 22 projects included in course. No special loss needed Course pays for their Write for Pres book of Intervine Trauing Service, Dept. D2-O Portune 13 Oregon

LEATHFRUMAFT Tremendous stock of besther tools supplies and a to in leather beautess over forty years Send the for hig twisting San Brus 1111 No Ard, Dept. 751 hit wanter 3 Wissentian

LEATHERCRAFT Motal Tooling, Texthe Painting Bouderalt Billineralt many other crafts Pun out problems? Proc big Dustrated estalog Write testay Kil Kralt, Dept. 381 Honywood 66 Cast

GTYLECEAPT sure fire hits. Pretruced" feather hits Handbags ha folds Prigrat ha to over fifty other projects Patterns on feather. Why trace? Just curve, assemble and mee Large ameriment Preserved hits also are able Send He for cuta of free furder Refunded first order Apache Leather Company 2006 E. Washington St. Phuerix Arizona

LEATHERCHAPT For Pleasure of Profit. Make Easy to-addenible pursets beils, gloves, decoakin tops 160 ether items for gifts of to sell gend for today for his culabon Largest Leatherstaft stock in U.S. J.C. Largest Co. 526 S. Tripp, Dept. 4264. Chicago 24

DO-It-Yoursell Leather Ere's Catalog Pres Drup Sc postenrd Son 2017 Tandy Leather Talas Objahoma.

40 PULL may Jig Haw patterns of beautiful sheres ornaments tops nove tes. Plus 'How, Where to Sell.' On a \$1.00. Maxtercraft 768, 7041 Chestl. Chicago 31, Ill, nois.

PREE: 34 page, Copper brass materiestalogue Groundmaster Company. Boulder, Colorado.

130 PRW full size Jigmey Patterns. Doword foreston gif a lawn figures up to 21 inches high action (merry-go-round) windows! tora useful gadgets Art at drawn \$1 Craftplane 1321-2 South Michigan Chicago S

HAVE Pun Make Morey 110 Jig Saw Patterns Trace Cut Paint Unusual An-issass Shetres etc. 61 Trans Plats. 35 25CC 481 Street. Planhing New York

KNICKIOWH Cedar Chest Lumber and Veneers Free Price Last. Glice Co. Brownship a Atalmena

LAMP Size express know nipple installed \$3.00 Cy Products Dept 18 Latayetic La.

COMPLETE piece for 6 foot sawback table and hench; with full size patterns assembly drawings, and building procedure, see postpass hiszon Design Studio, P.O. Box 63-2 Stamford, Connecticut

BUY wholesais nationally advertised Pan American Bayers 638-27 Lindon Be Cale & New York

KNOCKDOWN coder there and tomber free price list. Bedford Lumber Company, Shelbeville Tennessee.

BULAREKHOTTERS Make belts handbugs carrierds due sensives etc Bierias offer Bog teer a book on alog said a surp eard name on the P. C. Herwig Co. Dept Pt.) 36 He ep St. Brooken I. New York

PREE In it Yourself tentretrett Catalog, Tandy Leather Dempany, Box 791-95, Port Worth, Texas,

LEATHERCHAFT Tools Leather Em-biosity Fiates Craft Acress on Dies Ca augus 10t Louis Jures Engineering Company 1613 Mair Port Worth Trees

BIDD IT YOURSELF

INFI ATE has more with agister than any gan gr my tast tasting new roods and are-usual aport. Do d your ewn apparatus. Brief mesanges his dreds of miles. Use fur target practice firms r low cost easy to-ha d Diagrams formula compress in-strictions beind 55 Central Machine Works Dopt. P. Stone Cip Seva

OEIGIER Counter and Metal Detector E to Instrume or Educational Proc Lit-erature E ectronic Appalentame Buz 4616, Washington & D. C.

INSTALL Sav-A Life Home Pire Aurm Bystem \$19.95 Office Wat hat before bre san gan headway Pur Lot eins ain write bus A-Lite Spatest Brottelair Courgle.

PAINT Sprayer from scrap lound most anywhere Plana 51 00 Pu is Booker Tex.

PROPIT from nature plane \$1 Bass, live 357 Petiancusa

BAROMETERS build outs free inter-ation About 1615 Third Avenue New THE LAUFE Tota 31

BUILD Clevenger a beautiful wrought bron ratings or furniture in one day cold bending weld of 13vet, Complete Bistric-tures Clevenger's, Box 1661 Santa Boss,

POWER Mover Kits, free plans, in-structions parts list. Tennes Movers, Springfield I Massourt.

BUILD permanent awhines, paties in-lousie perch, bathtub and shower unplo-sures. Aluminum prefabricated frames. Assemble pourself and save. Close-out prices. Russ Smith, 1866 Ridgewood. Cleveland T. Ohio

DRIPTWOOD Lamp Eits complete with driftwood, brass tubing, wiring, fixtures, 33 95 No COD, Driftwood, Box 2361 Kenmore 22 New York

PARS Window and Atts: From Kita. Torrington Steel Blades, full size pul-terns. Catalog Free. Gilliom Power Tools. Dept. 41, Lambert Pield, St. Louis I. Mo.

no TOY Plans Sec. "Original Idea."
Shally built using household Roms. M.
Massorro, 1830 Waverly, San Anisais. MARGOTTO, 1838

CONCRETE Block Romes 27 page bookiet on how to build \$1.05 H C Laghtlook Civil Engineer Richburg Pa.

READ Philosophy Of the Low Cost. House then build fifty foot rancher Sound construction, insulated pitched roof wide overhangs & picture windows eight foot on inge heautiful floors intest plumbing besting extpolt Solves low inturne and financing problems. No long term dept Booket and step by step thustrated building plans \$1.00 Cot started -How Carlson & Swed th Runch House But 361 Dept. 7 Les. Massachusetts.

MACRINIST Tool and Districtors — make your own Falented Vice Jockey Complete 4 drawings \$2.00. enclose self addressed label Vice Jockey 361 - \$164. Street Brooklyn 9 New York.

A.R. Cond tuners-Rome or Automobile Bee fee of ad puge 252

OLD GOLD JEWELLY, WATCHEN, ETC

JEWELRY making Bend the for little-trated catalog Mandy-Fair Co. O P Q. 1126 Sen York City I

FRIE Sample pair of Earrings shows you how easy it is to make beautiful enc-New Cutaing 25c Barry s 279 Ardaley Court Newark New Jersey

WATCH Repairing-Modernized Correapondence Course. Pree information WatcHealing Institute. Sex 34715, Les Angeles 34

LOWEST watch jewerr prices Leading brands Catalog 25c Addams \$270 East 16th Terrace Karina Cop 26 Missouri

1) JEWYL Burm watches \$14.95 Plus 16 - tax Men a shack resistant wa er reesstant anti-magne in incubies s'a niesa on another hand bad so at dignated match and expension baid flattefaction No. C O D October he as 1420 Res took Memplan 11 Le resone

RM MENTONIAN Jews to Settle go Camour Deut is Brade Housey K is Bend 10c for Literrated Caraling J & M Nevelties. Clept CH 4 Crimins Indians

10 KWISS watches \$18.05 cutaing 10c Berkowitz 3110 Castlahi . New York 43

RICHERT Cash Paid For Old Good, Broken Jewelry Cond Treth Watches Dramonds Suretware Passium Cycciacies etc Pror information dat afaction Guaranteed Rose Reflors, Heyworth B 44 C ...cago 2

TORACCO & PIPER

PIPE Smokers' Char Smokers' Proc S-bestroust cavalus offers fabricust savings on choice Superted and domestic pipes organs tobarcos supplies Write Wally Pra & Dept 2, 156 Massan Street, New Y 12 16 N Y

HERE'S a safety ash tray used by a head of a reraft manufacturer and no trouder its complete r nurry-free yet handler to not than emistary ash trays Rugged alignetate plated metal For ship home office Whiting and primpt maney back guarantee The Jackson's P.O. Bux 807 Motions. Oregon \$2.00 sach 2 for \$5.00.

FOR THE NOME

PUBLIFIER for re'rigerators freezers. tee house etc. Unit one year supply \$1 \$6 Sporter Products. Box 2366. Dept. P. Kanmore Il Rew York.

CLEAR your cost furnece with birged Products Box 232 Possesso Idahu

NEW I Electronic Brain, automationly defrosts retrigerators turns off and on televisions radius tenaters bruse cable. ete Arytime of the might or day - 60 95-free of Frimation Was seens Liestronics. The Bus 668 Dept 2C Newsra I N J

POAM rubber furniture quablons Pasfory seconds 26 v discount, Free cutalog Perms Posm, 100 & Main Street, East Ocasgo New Jersey

CERROCLE septie tanks, outdoor follows commend dendericed. He purposed figures or moving hereastly licensed the purposed to t Beating 34 Mass

NU-float toilet adjuster Stope hissing -Summer Screet, Stamford, Conn.

SEPTIC tanks outdoor todels recondi-tioned dendurated a thout digwing pump-ing Easy guaranteed do P-yourself method Free Write Granite State Indus-tr on Box 1870 Manchesser R H

FREE cutalog of lifetime may to clean, Blattiers Blev! Burbnarers for your huma Cup rack spice rack hundreds of spe-cialty stems sated too Learn about the apricial Pres O.R. sont with our enstoners priers during July Dept. 72 Homemakers Ecoholicy Service 4456 M. Ravenswood, Unicago 46 Lumota

AUCMINUM Orilles-Benutifies protects -adjustable all Screen Doors Frm Pamphiet Tamiami Ouli Shape, 1309 - 16 60.

70 OF INTEREST TO WOMEN.

ADDRESS Advertising Postcards, Must have good bandwriting Box N.ne. Water-town Mass.

HOME Business opportunity making literature to new mothers. Everything literature to new mothers. Everything literatures at 90 Statement Company Posteria M. Ohio.

EMBROIDER Stamped Lineas Buy direct from manufacturer and save Send in Pres catalog Membes Dept 307 22 West 21st Street New York 10 K Y

THERE on hims of pine cleaner for hundwork the etc shows without scrubbing of riving dend \$1.00 to R. W. Hoberta \$2. Mother Street, W. Springfield, Main.

MARCO Waterless Cookware Fourteen plece set, eleven inch fryer price \$30.00 dedwared. Fifty dollar value, Buttermik Face Farhance Bux IDI Pace Perca

Direct is an irrared love y once butdered pure it see handkerchie. Oit i packaged it posts and Irish Carrest to Be mertion Boad. Bu irraresh, Code Freiand.

tikijW Muszrawata Cejar stret and we standare Bjare ju time jear to id We pay \$1.50 th We pay \$1.50 th to your Book. Washington Mush-room Ind., Dept. 181 2654 Admiral Way Ben'ite. Washington Study.

DOLLARS from used Nylons. Make into lovely Phowers. Coranges. Sure sales with our pensaturns of up and complete hit details. \$1.00. White Specialty Co., P.O. Bux 530aN Cleveland 1, Ohio.

JAPANERE Don Madem Butterfy Hand Made 15" high, Beautiful Decorated Conjectors Item 20 55 Postpaid Remit International Money Order M. Tsuji, Yogori P.O. Box 21, Tokyo, Japan

11. FOR SALE MISCLIDANIOUS

CATALOG on government surplus from eventry a largest surplus. I particular special rate of particular special rate of goods that are excepted equipment. Hurdreds of terms of rading lesses month books to take particular surplus Collection of the surplus Radio (6 Rockway). New Jersey.

CITALL LATE Hairgrouth remove dandrall alog backress has all Amour Book in market said the second august \$3.75 Conquintadores, Box 131-B. Meetile N. M.

OUARANTEED bergains by mail! Unusual original (term) Catalogue 10c (rejundable). Paramount Nove to Co. Dept. PM Bux 46 Paramount, Ca. orn.a.

DE WANTED MOSERLEANEOUR

BCRAP Mercury (Quicksliver) contal eta sup ed Tan a m hamain Trigg en Mila jurg cul Padrica Co-Establithed 1908, 35th & Moore Streets Physics the 46, Pag

QUICKBILVER Fistinum Uliver Dismonds Prompt Payment, Mercury Terminal Norwood Massachusetts

15 TATTOOING SUPPLIES

TATTOO!NG Course and Report Bro-1 chures. 25c. Zets School, 128 Leasy Rockford Illinois.

TREASURE PUBLISHED

(IOLD. Silver, Meta) Detectors, Conger Counters for Uranium, Mineralishts. Sensational new fully guaranteed models none Finer Information Free Detection Corp. 5420 Vinciand Ave., North Hollywood Ca. Johns

TRIANTER H riem New 11 provide tearbetweight Model 101 levalor for gold anter and comprais Model 101 levalor for gold anter and comprais Model to back guarantes best available Also De ger Complete parantam prospectors 6 rete to remain free. The Goldak Company 1866 W Glenoaks Blvd. Glendale 1. Cadi

SELECTIVE metal and mineral detector Revolutionary design. Distinguishes metals from 6 ark magnetic sa de Readon detects metals u der sa f wa er Also the cer Courte a Free piece ure Cardiner Featument Company 2018 N Daylon Physica a Att. 11.0

URANTI M Gold Elliver Treasure New Power-packed highly sensitive firsted detectors and Oviger Counters R t and factory assembled modes from \$34.50 I ships t weight gustan eed. Free I terature Electronic Applications. Box 1975. Washington 8 D C.

BOTH TILATION counters for gratium properting \$279.95 ppd in U.S. Cichrane Instruments Box 71 Moroton Conh

TREASURE M-Scope Origer Counters. Misseral Lacators. Why buy something discreas when you can hap the best at a judge pice! Backed by years of experience Pauly quaranteed by factory Detects to hereis metals gold at sec counts Payment many attainable Provensuage for performance Pine 16 page dissipated bush et Pinest Research Lab. Loc. Pain Acc. Caul.

28 WATCH REPAIRING

WATCH and clock repairing banks for hobbysts Free information is orb Ameriests Dept 34 G 2330 N Milwaukee Chicare 47 Intueto

WATCHMAKERS Jewslers complete biormal ve calazique for Bengal Company Cover City California

WATCHMAKERS Journal for watchmakers students hobby at \$1.00 year Summer count for But \$216 Daytona Beach Florida

WATCHMAKERS! Beginners! Watches Movements. Descriptive that hox 150 Chicago 90 tilinois

THE MERCELLANDING

OUTDOOR Toilets, Cesspoors, Septie Tanks cleaned, decdorized with area as faite harr one pander East occurs a cut to one Bases digning pumping 150 000 clustemes a gartar or anticartura Delant Pres. Burson Laboratorius, Dept. Q 53 Chicago 22, Illinois

HOME study for same warden tish park Investry wildlife and patrid service Deta a ree Wille Desput Institute 44 Westitler California

ADDRESS Advert sing Postcards Must have and handwriting Mos Name Water town Mass

BART S Home Barbering Book Learn to term men a Boy a and a ris hair Set d \$1 to Bart a Box 567 Boston Manageriasetta

MAKE more money Pitane at Secrets shows how Master Plan for Success in a ded Both guaranteed Send 61 today fies Bush's 6112-X Suport Holgswood 26 California.

FLOWER pot cubber covers of various colors and sizes. I also form that aid red clar pot into an all racine task Fut particulars will P. Masciaha 1 17 So Barrington Avenue Las Auge es 28 Laid.

WAP unwanted articles for useful once Fend your name, address and names of articles you wish to swap plus \$1.40 for but of astroles and proper warning to comp Year manie added to not free Trades But \$35. Jackshire. Texas

IFART Pertune To ling cars aimple profit able. Money back guarantee \$1.00 20200 Hark Canto can

23.43 interesting ma a three was the 25c rear \$1.00 Haivey Teaple Decay at 13th MAIL MAL Dates an idried figs paulon, has History Top at Empore Carl

GET the Opportunity Packet for the] intest and best money-making offers in majoriter Everything for the Redmon Ca, or Help to 2 Marriand

LIST your name in "Big Mails Get many offers 25c Cash Refundable, Walter Rix Box 6521-B Cleveland I, Ohio

WIFOLEMALE naturnally advertised merchandise, 20%-50 - discounts Sell retail, make his profits, Big catalog 50c. Wilco Pox 615 Atlanta 1 Georgia

to NOW Manneson Ce, ar shed and made are dears Spare full time year round We pay \$3.50 ft We paid Babbitt \$4.165.00 in less weeks. Free Book, Washington Mushroom Ind., Dept. 102, 2054 Admiral Way Seattle, Washington.

SURPRISE Packets Unusual interesting 12c slamps Hillion Specially Black-wood New Jersey

BUY Wholesale thousands nationally advertised products at big discount Pres Wholesale Plan American Buyers are by Linden, Buffalo New York

RECEIVY Magazines samples total legiore Ma a (Ivm energythese Office p dress (Ip) taked 25c Resick Bot us M (Indianate 25 Object

SENSATIONAL all purpose fire extraguisher for homes care busin camps. Operates by pressing button refliable Or y \$7.85 including wall bracket postpaid check in resurder Attas 75 of Met ropositan Avenue, Queens 29. New York

SPAN.5M Hermit Ten, Delicious' Early Musicularies used it as refreshment and not decly' tonic for suggest kidness in the Satisfaction guaranteed. Spanish Spar Trading Post. Mosilia New Mexico BIG mall, publications. Mr. Midhard Specialties, Box 653, Topolts Mar eas

A NEW home anyone can afford send \$1.00 for folio, United Home Builders Asmenter Box 1707 Robonia Station, Minters in 17 M nn

BUY Whosealer to the decounts? Large Ca and of Manons of Advertised Colts Ass inners, Watches, Jewelry Cameras Typewriters, Tools, Efficientware, etc. Start your own business, Details free, Consolidated Distributors, Box 1537Y Palerton, New Jersey

to PERSONAL

DEFECTIVE & Opportunities Detective particulars from Write. Wagoner, F-125 West 8th, New York 24.

HOW Can I Find Out?" You Can! Information confidentially developed. Any matter person problem. World-wide. Office is derived Established 1922 Winnam Herman 1'0 Broadway New York

RUFICHELY Bomething different Latt Cost No ins strain No startic No pressure on hips or at no local entire Wire by Mechanics Parmers Livetors etc. stervillers Guaranteed Write Ha dlact Fredicts Dept P.S. Presion Out. Cat ada. Established 1803

INCHEDIBLE Become Mental Superman Overing 1 Pres Book et Bjow Bon 127 IM Bookwood M Canfornia

ADDRESS Advertising Postcards, Must have good handwriting, Box Nine, Water-town Mass.

PSORIAGIS Victims Royeless New Discount Pres Trial offer Weste Pinacos Reads & M. Clevenand, Obje

POOL your friends 6 posteards was ed 51.00 Letters rems ed 25c form beautiful Newport Brooks Island H M Durey Majering persone 12 Armold Avg Newport Brooks Island

ERGITERIC Curiosa Rare Adult Books Malauscripta Fanghieta Readers Buck-sets Evaluate Preschi German Indian et the author or subjects deared Brade stamped envelope for reply Prancase But Ph 2 565 Broadway, New York Je New York

INTERTIGATOR Training Experience unbecasses; Many population from Price particulars. Free credentials Exchange heriot Service System, 4300 Broadway Chicago 13 Juniosa

HAND Graide Corrects vous Perma of the in to nous West Per ect Permanalism Box 665 taP 90 foun Massours

INTERESTANT Ma is - 25c herrs your mail box full three months. Bests Gest-J III Chatana Mantagapa

PAUL Lee is back-Carter floud South Yairnouth. Massachusetts

ATTANTA address bightness or personal Morti 5 rates Detain free Remarks 25c Confidential Walsard a Bult 615 Atlanta I Gente a

THEST BLES! Personni Financial Health Marriage Confidential \$1.00 ftg-funded bran school Nex e Bantoid Mich

CALIFORNIA Mail Address' Receiving Forwarding Morthly Rates Letters remained 25c Statiks Sox 2010 Sup. Prancisco II

BUY Wholesale 450 900 Products Literature Prec. Carter Box 6011-Q. Chicago 60

"X-RAY Mind" Dengarous power over other to Details for Kitabuar leat to e. 1912 Lincoln-Park-West, Dept. PX, Chieston 14.

CHICAGO Remails 25c Potwarding one sidential. Winslow, Suite 635, 4000 Marine Drive, Chicago.

LOS Arige to Remain 25c forwarding tot edebtia. Moreier 436 fin Oxford Los

PETTERS remained in Oregon 25c Hobbs shop Box 4 B Williamina Oregon

Late Angeles composte Sunday Help War and columns accounted \$1.00 Southern Call'office emportment bosome questions answered \$3.00 refundable 3.500 P. Nor and Box 266 Norwalk Castletota.

WLAR at our risk! Oneran sed wrist watch with jewered movement and supantion hand Price 1.8 Set.4 35 to able the weeks; Plans, Walch Co. Box 22 Oten Oaks New York

MEXICAN Law General Practice Attorncy 1202 Arizona Street El Paso Texas

news & notes

You can get a nickel-cadmium battery for your car now. The batteries, said to last 10 to 15 years and withstand almost any abuse, are being distributed by Chrysler in six- and 12-volt types. Cost: over \$100...An aircraft machine gun that fires 20-mm. shells and .50-caliber bullets interchangeably has been developed by Ford.

ADD TO THE NEW DRUGS that doctors are studying: arfonad, which reduces blood pressure so drastically that surgery causes almost no bleeding (developed by Hoffmann-La Roche)...narcotine, a cough medicine that is derived from opium but is not habit-forming (developed by Merck)...a blood-plasma substitute, known as cross-linked glutamyl polypeptide, that may be better than plasma itself (developed by Veterans Administration).

THE FIRST NEW COMMERCIAL LIGHTER-THAN-AIR PILOT IN 15 YEARS
got his CAA license in Miami recently. He's Merl
Brown, a blimp skipper for Goodyear...A distance
record for the high-altitude research balloons
called Moby Dicks was set when one launched in California was found 6,250 miles away in Spain. It made
the trip across the U.S. and the Atlantic Ocean in
52% hours, averaging 120 m.p.h.

changing electricity in the air to make People feel Better
is suggested by Prof. J. L. Worden of St. Bonaventure University. He points out that certain room
heaters generate positive electrical charges, and
adds: "It was known that persons in rooms so heated
frequently complained of headache, nasal congestion

Where the Heat Hits Kardest

100 TO 200 HOURS

201 NO TO 1000 HOURS

202 NO TO 1000 HOURS

203 NO TO 1000 HOURS

204 NO TO 1000 HOURS

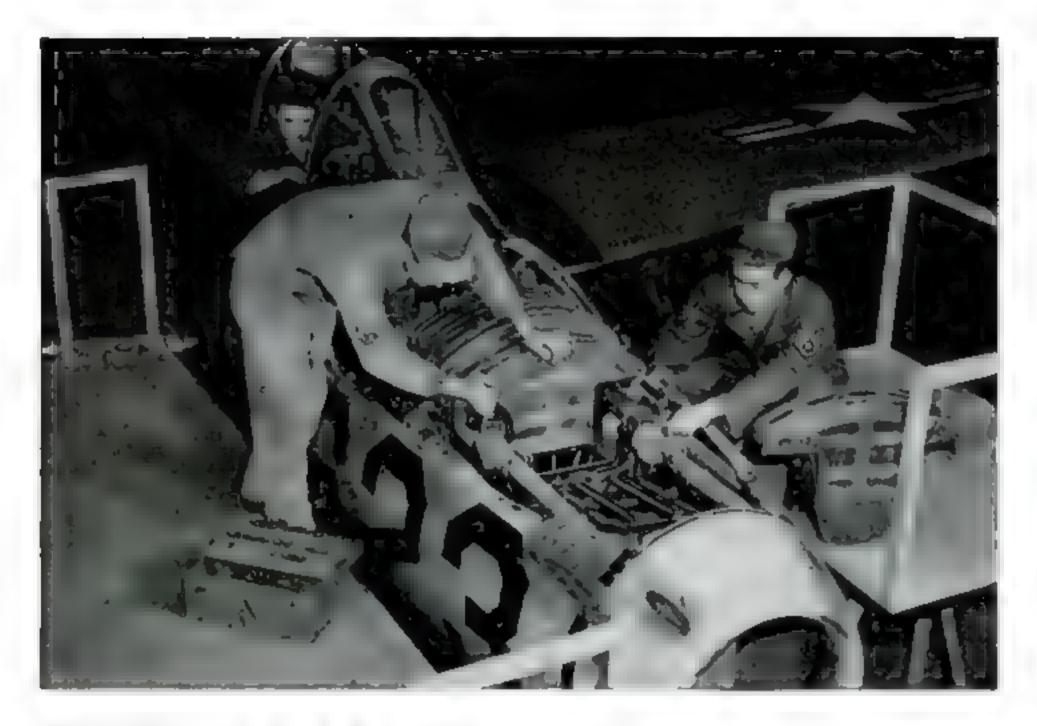
205 NO TO 1000 HOURS

206 NO 2000 HOURS

206 NO 2000 HOURS

and other discomforts." Negative charges should have the opposite effect--and tests on hamsters indicate this may be so...It'll be cooler in the cooler at Olney, Ill. They're air-conditioning the town hall, which includes a threecell jail ... Even in Maine an air conditioner will come in That northern area handy. will experience at least 100 hours this summer when the Mercury will exceed 80°, as the Frigidaire map at left shows.

200 to 200 HOUR.



YOUNG MEN: Learn Jet Mechanics ...Radar...or Electronics as an Air Force Technical Specialist!

Now you can get in on the ground floor of jet aviation! Learn and advance with the organization that pioneered jet flight... the U.S. Air Force. You may specialize in anything from Turbo-jet Engine Mechanics to Airborne Radar and Electronics... with over 400 technical courses available. While training, you receive the full pay and allowances of an Airman. Upon completion, you fill a position of responsibility—keeping those thundering Air Force bombers and jet

U. S. AIR FORCE

fighters flashing through the skies for freedom.

Your future is assured. You are prepared for the day when jets of all types span the airlanes of the world. Train now for a top position in this exciting field . . . in the United States Air Force!

FILL OUT THIS COUPON TODAY! -	
PERSONNEL PROCUREMENT DIVISION U. S. Air Force, Weshington 25, D. C.	\$ 1
Please send me more information on my oppor tunities as an Airman in the U.S. Air Force	t.
Name	
Address	
City	



by Frank E. Williams
Inventor of the Continental Life-Time Battery

If you've ever invented a new product, or worked out an improvement on an old one, don't be discouraged by people who say "you can't compete with big companies." Read my story. Then roll up your sleeves and get busy—it's easier than you think!

TWELVE years ago, I set out to develop an improved storage battery with the greatly increased power that I knew would be required for the ears of the future. In addition, I wanted this battery to last 4 or 5 times longer than ordinary batteries.

Like most car owners, I wondered why batteries hadn't been improved more since the days of the Model "T". First I found the answer to this problem and then I did something about it. My own belief was that many new battery improvements died on the drawing boards because of the widespread fear that they would make batteries cost too much and the belief that batteries which would last five years or more would upset part of the battery market.

The Secret of Building A Better Battery

Basically, there are only three ways to put more power into a battery:

Use a different metal for the plates.

Make the plates bigger.

Speed up the circulation of the electrolyte.

In my search for the ideal plate material, I reviewed everything that had been tried since Volta's original battery in 1801, including Ritter's gold-ammonia battery and Gautherot's platinum plate design invented over 150 years ago, besides plates now used in European batteries.

Working with metallurgists who had pioneered a method of increasing plate density, I decided on an alloy now known as the "neutronic" plate which combined high power output with exceptional resistance to sulfation—assuring vastly increased life.

But the big problem — the weak link that had held back battery design for many years — was the insulator that kept the plates apart. When the insulators broke down under heat and acid, the battery was doomed.

The answer, I found, was a porous synthetic insulator. Tests proved it was completely unaffected by acid, and so perfect an insulating material that it could be made considerably thinner. This left more room for plates—and thicker plates meant more power.

Moreover, the porous synthetic insulators let the electrolyte circulate more freely, keeping the battery

cooler. This last point was actually the most important of all, because internal heat is a main cause of battery failure.

Five of our early experimental batteries were put through S.A.E tests. They were completely run down and charged, run down and charged from 604 to 1142 times for an average of 753 lives. I knew then I had a battery which could outsell anything else on the market —if I could get it on the market!

Free Advice Didn't Help

Well, I had lots of free advice from well meaning friends. Typical remarks were. "You can never market your hattery even if it is better unless you have a million dollars; the big companies will run you out of business in six months; why should anyone pay more for an unknown battery even if it is guaranteed for six years?" It's a good thing I'm a hard-headed Dutchman because this just made me work harder to make my dream come true.

Let me say right now that I've had no trouble with big battery manufacturers; in fact, one of the biggest on the West Coast has helped me all along the way.

As it developed, I had plenty of time to work out production problems because of wartime and postwar shortages.

By the time I shipped the first few hundred batteries to Alaska and Venezuela for arctic and tropical field testing in 1952, one of the original Life-Time batteries had already lasted eleven years (and it is still in use today)!

Automotive, Scientific Editors Torture-Test the Life-Time Battery

When the word got around that the Life-Time battery had survived rugged field tests in the 40-65 below Arctic winter and the 100-plus Venezuelan summer, technical writers and editors started coming in to ask questions.

"Why do you call it the Life-Time battery?"

"Life because of its power, Time because of the time it will last."

"How long will it last?"

"I don't know. Ask me again in another fifteen years. I'm guaranteeing it for six years because that's a conservative figure."

When they got into technical questions about the Life-Time battery's construction and performance, I had just one answer: "Take a battery, test it any way you like, tear it apart if you want to."

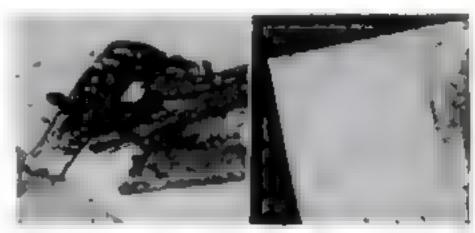
After that, things happened fast. The editors of Motor Trend magazine tested the Life-Time battery against two of the best-known high-quality brands, rated the Life-Time "outstanding... has unprecedented life expectancy."

Others editors and researchers did about everything, as one writer commented, "but throw bricks at the Life-Time battery trying to make it give up."

Dozens of articles were written about the Life-Time battery; you may have read some of them in True, Popular Science, Motor Life, Argosy and others.



Twin-battery bake even test demonstrates how ordinary batteries fall when heat causes insulators to break slown, plates to buckle. Improved design keeps Life-Time battery cooler, increasing power and life by maintaining higher water level.



insulator at left was taken from a popular brand battery after one year, destroyed by heat and acid. Life-Time insulator at right was taken from a battery after five years of service.

The Experts Were Satisfied —But I Wasn't

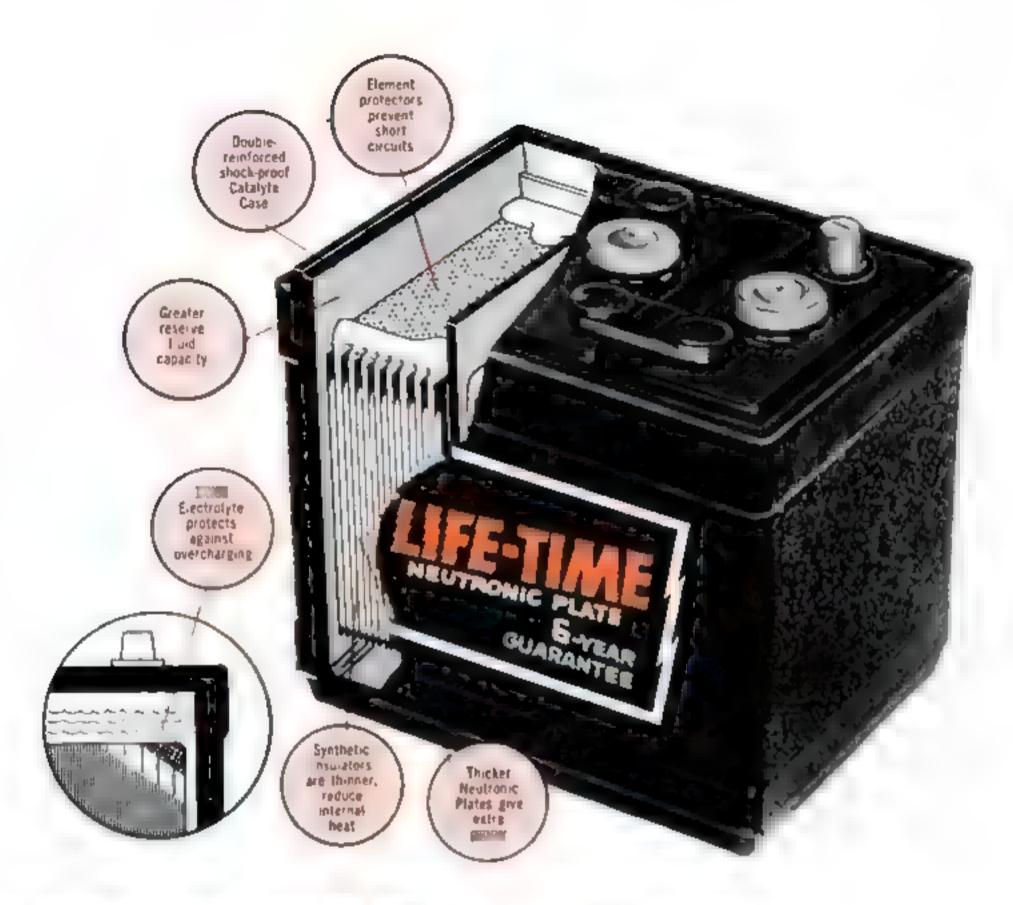
Probably I shouldn't admit that I'm still not satisfied with the Life-Time battery, but it's true. Recently, for example, we started adding Tellurium to our grid metal.

Technically, it is a fuscinating metal—if you can get excited about facts like these: "... atomic number 52, atomic weight 127.5; 3 isotopes, atomic weights 126, 128, 130... hexagonal-rhombohed al prisms, isomorphous with stable grey scienium..."

All you really need to know about Tellurium (actually, you could probably live without this information, too) is that it was discovered in 1798 in a specimen of gold ore from Austria, but nobody could find a use for it for over 150 years. Now we use it to further increase the life of Life-Time batteries. How much will it add to the life of our battery? Ask me again in 15 years or so. By then, our laboratories will have made still more improvements.

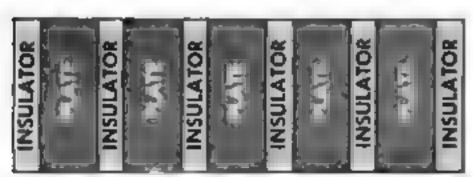


For construction details of Life-Time battery, turn page.





Diagrams show how thick insulators in ordinary batteries leave less room for plates. Insulators used in Life-Time batteries are thinner, making it possible to use thicker plates for more power. These persus plastic insulators permit acid to circulate freely, keeping internal heat down, increasing life.



Advice to Inventors: **Don't Worry About Imitators**

Naturally, the success of the Life-Time battery has attracted imitators to the field. By using names similar to Life-Time, they hope some of our success will rub off on them. Fortunately, they can't duplicate our battery, which is the only thing that counts. Their competition hasn't hurt us - it never hurts a superior product.

6-Year Guarantee Backed by Multi-Million Dollar Bonding Company

At first, I considered guaranteeing the Life-Time battery "for the life of the car." But since industry figures showed that the average life of a car in the hands of one owner - which is the way "life of car" guarantees are set up - was only three years, I felt I could go stronger than that I guaranteed the Life-Time battery for six years - regardless of how many cars you use it in.

Although I feel six years is a conservative figure well within the life expectancy of the Life-Time battery -I asked one of the world's largest companies if they

LOVED TO COMMENT



Millions read about the Life-Time battery in national magazines; millions more hear about it on network radio and TV broadcasts of international sporting events, including the Indianapolis "500" classic and Pan American Road Race.

Dealers and Distributors Needed to Fill Orders

Life-Time batteries are now rolling out of four plants, with two more scheduled to start producing this year.

If you have a retail store, such as a gas station or garage, and would like to fill the orders that come in from 4-page ads like this, plus network radio and TV broadcasts, fill out the Dealer Information Request at the bottom of this column and mail it to us.

If you have facilities for warehousing and delivering batteries and other automotive produets to our growing dealer organization, write us for information about distributor franchises. These distributor franchises are not sold to anyone; the only capital required is for merchandise inventory Write.

Continental Manufacturing Corp., Dept. PS-7 Washington Blvd. at Motor Avenue Culver City, California

Dealer Information Request

Continental Manufacturing Corporation, Dept. #5-7 Washington Blvd. at Motor Avenue, Culver City, Calif.

Gentlemen:

I have a retail business and am interested in filling orders here for Life-Time batteries. Please rush me complete information about a dealership.

them.		
Address		
City	Zone	State

would back the six-year guarantee with a bond. After a thorough investigation, they agreed that six years was a conservative figure and issued the bond—the first and only time such a bond had ever been written.

One Price For All Cars

Most batteries cost more for, say, a Cadillac or Lincoln than for a Chevrolet or a Ford. This, I feel, is unnecessarily confusing to the public and to dealers who have to keep the customer waiting while they look up prices. By setting just one price for all cars, we were able to eliminate so much bookkeeping that we could absorb the additional cost of the few larger models. The full price in continental U S of the Life-Time hattery is \$29.95 for any sex-volt size, which includes light trucks as well as passenger cars. All 12-volt sizes are \$34.95. In addition, we make batteries for all farm, marine and industrial uses,

Order by Mail; Your Dealer Will Deliver

Since this is about the largest battery ad ever run, I want to try something new. I'm not interested in selling batteries by mail in competition with our 10,000 dealers, but I can do this, if you would like to order a Life-Time battery right now without going to the trouble of looking for "your nearest dealer," as they say in the ads.

Just fill in the order form at the bottom of this page; we'll have your nearest dealer install your Life-Time battery. Tell us the make, model and year of your car, enclose \$29.95 for any six-volt size, \$34.95 for any 12-volt size, or enclose only \$5 deposit, pay balance when delivered.

Here's what you get for your money: first, higher amperage, which means more power for starting, lights and accessories; second, savings on battery replacements which can amount to about the price of a set of tires over the *Life*-Time 6-year guarantee period.

any battery. The best time is in Spring or Summer, because the driving you do in warm weather actually "breaks in" your battery for the cold weather ahead.

Washingto	n Blvd. a	cturing Corpo L Motor Avenu	ie, Culver C	ity, Calif.
Gentlemen	E			
Please ha Life-Time I		earest dealer i my	or wareho	use install a
		-4 4	d.	_
Make, mor	iel, year	OT COF OF TITUE	16	
enclose (\$29.9	or car or truc 5 for 6-volt be no charge	() \$34.95	
enclose () \$29.9! here will	for 6-volt	() \$34.95 for shipping	or handling
enclose () \$29.9! here will	for 6-volt be no charge	() \$34.95 for shipping	or handling
enciose (t enciose () \$29.9! here will	for 6-volt be no charge	() \$34.95 for shipping	or handling
enclose () \$29.9! here will	for 6-volt be no charge	() \$34.95 for shipping	or handling



SEE YOUR CHAMPION SPARK PLUG DEALER FIRST



Don't let a lazy, inefficient engine take the fun out of your vacation. You've planned and waited all year for this trip...start right with a visit to your Champion dealer for a prevacation plug check

Stand by and judge for yourself as your Champion dealer rates the efficiency of your spark plugs on his modern service equipment.

He'll clean and reinstall them properly or, if you wish, install a set of new Champions.

Full-firing Champion Spark Plugs

maintain efficiency under the hardest driving and provide an extra reserve of power in the tight spots. They'll pay for themselves before you're home again—in performance, economy and peace of mind.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, ORIO





Endless chain of buckets dips deep into muddy pond to being up gold-bearing rock and sand.

Mammoth landlocked dredge gulps up pay dirt by the ton, sifts out metal by the ounce.

By Andrew R. Boone

YOU can still strike it rich in the placer fields of central California. But the modest grubstake that put the fortyniner and his pan in business won't take you very far today. So before the gold fever gets you, check your bankroll.

Peel off a million or more for a boat;



the 900 POUNDS of muck scooped up by each of the dredge line's 116 buckets contain about three cents' worth of gold. The dredge handles 17,000 tons daily.



GOLD-BEARING MATERIAL is blusted by high-pressure water jet in revolving-screen drom where it is broken up. Gold sand sifts through as rocks are carried off to rear.



FUNNEL-LIKE DEVICE is a rougher jig in which gold sand falls on a bed of water and shot. A pulsating diaphragm forces the shot upward; heavier gold sinks.

Dredge takes its pond along by digging out in front . . .



although the craft is big enough for seagoing duty, you put it in a man-made pond and anchor it securely to land. Start the machinery, and the odd-looking vessel pulls itself forward at the pace of a lazy snail. Its dredging buckets gulp huge quantities of gravel, sand, rock and muck, which are spewed out as waste at the other end. Somewhere in between there will be a tiny trickle of stuff that is gold.

Such a craft is the Natomas No. 6, which I recently visited at her land-

locked location 25 miles from the nearest navigable river and 100 miles from the Pacific Ocean. I was welcomed aboard by the "skipper," Burt Spalding. A bronzed little man, he was swinging a pail in one hand.

Rainbose's End: A Pot of Gold

"A week's work," he said.

I looked at the stuff in the pail. "That dirty sand?" I asked.

"About \$10,000 worth of gold there." During his 32 years of digging gold,



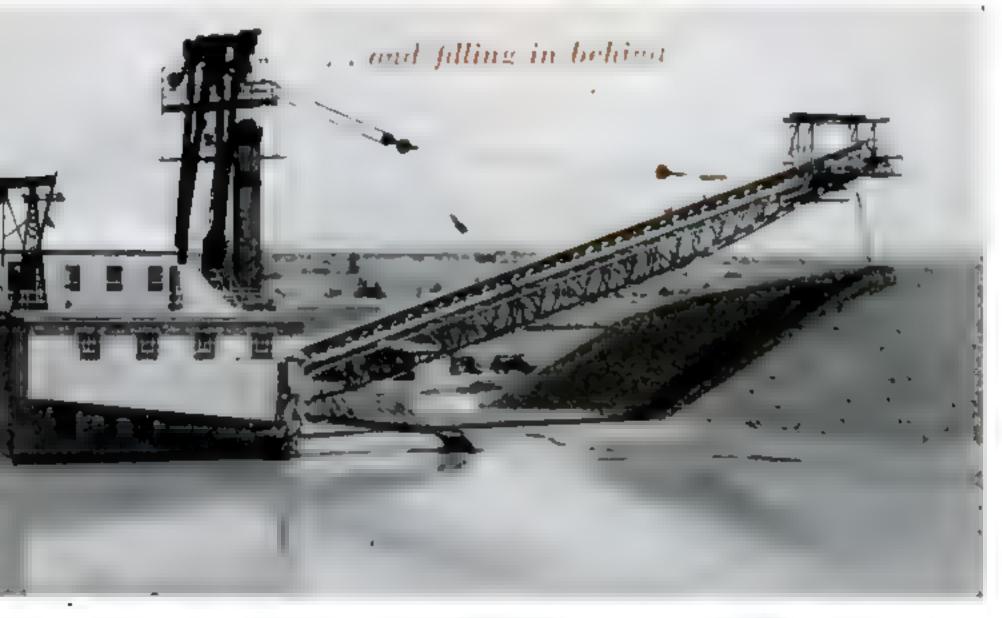




SAND leaving shot beds, still holding some gold, is carried through water pipe and dumped on recovery tables where mercury picks up more precious particles.

DREDGED MATERIAL, however, is mostly waste. Here higger pieces of rock ride an endless belt up to a 187-footlong stacker which dumps them on a waste pile.

PAYOFF for a week's dredging is in this pailful of "diety stuff" that will be refined to gold—which Uncle Sam will buy and bury in the ground again at Fort Knox.



Burt has sent more than \$12,000,000 worth of gold-in-the-rough to the smelters. Under his practiced eye, an endless chain of manganese-steel buckets gnaws ceaselessly at gold-bearing gravel. He has ridden these boats when, buckets snagging on rocks too big to lift, they pitched like small yachts in angry seas. He has enjoyed the placid comfort of bucketing up fairly soft sand and small rocks.

Like all gold dredges, Natomas No. 6, which measures 470 feet from the end of

the gangplank to the tip of its waste stacker, was especially tailored for the job. Before construction started, a hole 450 feet wide and long enough for No. 6 to swing easily from side to side, was scooped out of the gravel. A wooden understructure was built, and No. 6 was then riveted together from steel sections. With the hole flooded, No. 6 was floated. The machinery was installed and the dredge was ready to go to work.

No. 6 will have bucketed through her innards 120,000,000 tons of rock and



MAKING GOLD BRICKS starts with melting the dredge's pay dirt. Here gold, plus some silver and impurities, is being placed in a furnace to be nielted by 2,500-degree heat.

MOLTEN METAL is poured into a bullion mold. At this stage it is 95 percent pure gold. It still has some silver, but a trace of platinum was removed in an earlier process.



WHEN BRICK has cooled slightly, it is picked up by tongs and immersed in a dilute nitricacid bath that cate slag off the surface.



COLD-WATER SCRUBBING cleans up the ingot. With remaining dirt particles brushed off, the gold bar now glitters brilliantly.

sand before her 20-year life expectancy ends. She will have chewed paths 30 miles long. She will have been dismantled and moved twice to new, nearby locations. She will seldom push forward more than 20 feet in any day and night of squealing and shuddering. She probably, will produce \$10,000,000 in gold

Digging begins at the top of the bank. As the buckets move, the dredge swings left, then right, pivoting about a 55-ton steel spud at the stern, its point embedded in the ground. The spud takes the thrust of digging. Swinging the dredge

is done by pulling in and playing out anchored bow lines. To move the dredge forward, the spud is raised and another one, on the opposite side, lowered. This changes the angle of attack, and on the next swing the boat inches slowly ahead.

Panning Gold Is Big Business

Why do companies like Natomas spend millions to send these gold-panning monsters waddling through the countryside? For a single reason: the gravelly lands, though the yield per cubic yard is small, contain millions in



WEIGHING IN at 338 ounces, this chunk of precious metal, at \$35 an ounce, will bring in \$11,830 from Uncle Sam. It is an average

gold. To make it pay, enormous quantities of earth have to be moved.

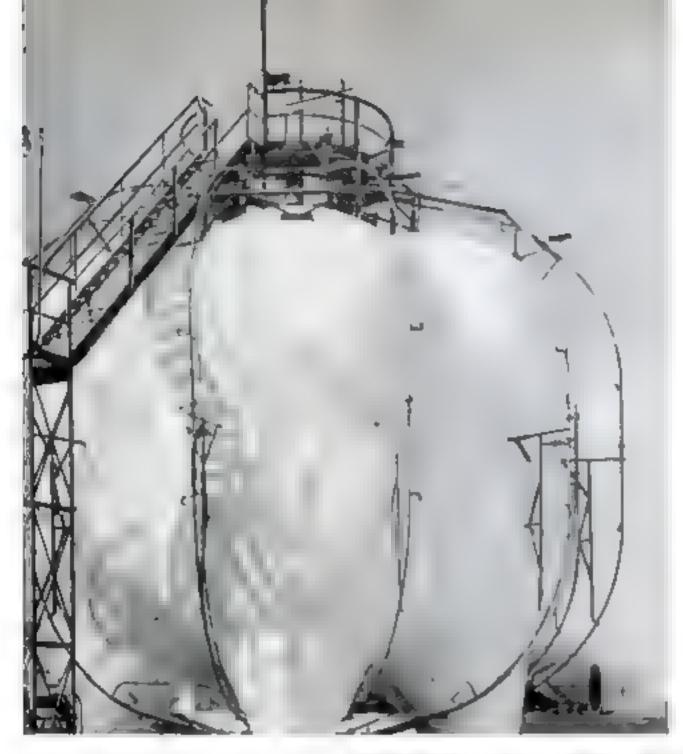
To get into the business, assuming you have the know-how, you'd first have to buy or lease several thousand acres of dredging land. To find out whether your land contains enough gold to make operations worth while, you sink shafts and take innumerable drill cores. You draw maps to show the extent of the gold occurrence. Not until then would you know whether the streams that once flowed from the mountains 150 miles away had brought gold tumbling down in their beds,

take for the dredge working day and night for 10 days. Salvaged platinum and silver is extra dividend, sold on the open market.

grinding the nuggets into fine flakes.

You should have several dredges to cut overhead. Backstopping them, you'll need a shop where machine parts can be overhauled and buckets repaired. Chances are good that you'll have to dig canals for carrying water to dredge sites. You'll need a big installation for electric power. You'll buy lubricating greases and oils by the carload.

Once you start work, you'll scarcely ever stop until the field plays out. Dredgers observe only two holidays: the Fourth of July and Christmas.



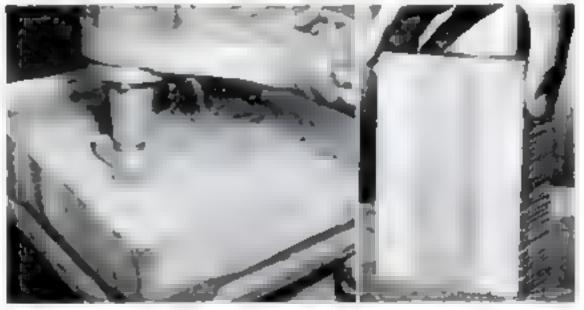
Honeycomb Gas Tank Stacks Cell on Cell

This lumpy monster of a tank stores 2,500 barrels of methyl chloride at a Texas plant. The 12-lobed shell is put together like a honeycomb. Openings in the inner partitions let the gas flow from cell to cell to equalize pressure throughout the structure. The tank was built for the Dow Chemical Co.

▶▶▶Are steeple jacks on the way out? A new kind of smokestack for industrial and public buildings is porcelain-enamel coated and never needs painting.

Welded Scrap Makes Bar of Scarce Metal

Trus stack of titanium sheets was spot-welded into a solid block in a tank of liquid coolant (right). The Glenn L. Martin Co. developed the process to utilize scraps of the scarce and expensive metal in the making of airplane parts.



They Say Now

L. L. COLBERT, PRESIDENT, CHRYSLER CORP.: "If we have built weapons of unbelievable destructive power, we have also built machines and developed processes which can bring health and well-being to many parts of the world, and . . . serve as the most potent weapon of all in winning and keeping the loyalties of nations."

JOHN T. RETTALIATA, PRESIDENT, ILLINOIS INSTITUTE OF TECHNOLOGY: ". . . Our battles will be won in the classrooms of our schools across the nation." HALL L. Hisbard, vice-president, Lockneed Airchart Conp.: "... the first nuclearpowered supersonic commercial transport... will fly at least two and perhaps even three times the speed of sound, crossing the country in less than two hours."

Lewis L. STRAUSS, CHAIRMAN, ATOMIC ENERGY COMMISSION: "For the first time since the discovery of fire, we have . . . a force [nuclear energy] with which we can enrich our lives incalculably or, failing to make that choice, we can wreck a large part b] what we have inherited from the accumulated art, heart, and spirit of the generations that preceded us."

The Great Windshield Mystelly By Frank Rowsome Jr.



Rumors of "disintegrating" glass spread wide. Crazed rear windows suddenly were news.

The amazing epidemic of pocked windshields seems to bear out a British scholar's analysis of "crowd behavior."

IN BARELY two weeks this spring, the U.S. epidemic of Windshield Pox flared up to a pandemic. It spread like a crown fire from coast to coast and from Canada to the Gulf.

In small towns and large cities alike the pox followed a typical pattern: it would hit town overnight, rage unchecked for four or five days, and then sweep on elsewhere. The classic symptom would be tiny pockmarks, ranging in size from a period to a dime, on car windshields. Occasionally whole panels of auto glass would craze all over.

One observable oddity was that, once

the first rush of the pox was past, the number of new cases would drop off to zero almost overnight. Matter-of-fact people blamed kids with BB guns, or psychos with homemade pellet projectors, or defective glass, or unusual weather. More imaginative heads put it to radioactivity, vibration from supersonic planes, unfriendly acts by flying-saucer personnel, and tiny, glass-eating sea animals blasted up out of the Pacific by H-bombs. A few calm voices put it to hysteria—a notion that tended to empurple car owners who had found tiny pits in their own windshields, or who



Under hard hammer blow, tempered glass bounces. Blow from a bottle shatters bottle alone.



had seen published photographs of dramatically crazed auto glass.

The groundwork: When in April PSM's editor told me to investigate the windshield pox, I had no head start. I was aware, though, that Buick had been bucking a widespread and unfounded windshield-breakage rumor ever since the new models were announced last January, And that in February a weekly magazine had printed a tale of a "mystery mile" of English highway where windshields were supposed to be shattering inexplicably. That the government had amounced three big thermonuclear shots in the Pacific on March I and 26 and on April 6. And finally, that on April 8 a weekly magazine with a circulation of 5 400,000 had run an excited account of 1,500 windshields pocked in a single week in Bellungham, Wash,

The Seattle story. PSM's western edi-

tor, Andrew Boone, hurried to Seattle, where pitting reports were heavy. In a few days his notes arrived.

"First reports in Bellingham mid-March, spreading in following weeks. By night of April 14, reports started hitting Seattle police board. Next seven-day period 4,294 windshields reported damaged in Seattle. Virtually none since.

"No pellets or hard substances found. Seattle police exclude vandalism. But officers meeting in Everett feel certain there is some vandalism. In Arlington, small pieces of white rock, of type used for roofing, found on hoods of some cars.

"Seattle police received 500 calls on April 15. They called Portland police requesting spot-check there. Back report: 8-9 per cent Portland windshields showed ordinary road damage.

"Notes from talk with Harley Bovee, U. of Washington expert investigating



But machinist's punch, above solid backing, produces this dramatic result. Note honeycomb.



windshields: Air-particle samples collected on greased plates, and test windshields exposed on building roof, showed nothing. Screened police reports indicate three kinds of damage: (1) flared cone if to in in diameter, occurring in one of every 10 reports; (2) pits about in wide and deep; and (3) trny chips, about 1/16-in. across, the commonest kind.

"Bovee getting some unusual reports on which he withholds comment: glass breaking on store counter while customer reported simultaneous itching; man on nearby island who reported seeing small glow near Big Dipper; and man who reported seeing small spheres emerging from auto tailpipes."

"Disintegrating" glass. While Boone was checking Seattle, I hit the road, too. First stop was Washington, D.C., at the National Bureau of Standards. The chief of the Bureau's glass section is C. H.

Hahner, a courteous, scholarly scientist who is widely respected among glass experts. "I can't help on some of those wilder stories," he told me, "but maybe I can narrow it down. Many newspaper pictures I've seen show something that's no 'mystery' at all. They simply show something the public hasn't heard of."

Ever since the late Thirties, Hahner explained, the rear windows of closed U.S. cars have been made of tempered, rather than laminated, glass. This is a special high-strength glass—commonly seen on modern store and office doors—that is about four times stronger than ordinary plate. It is made by suddenly air-cooling the surfaces, which sets up "frozen" stresses within it.

If tempered glass does fracture, Hahner told me, the entire pane or light crazes over all at once. The moment its balanced stresses are upset, the glass



Bloory! In our rear window, with "sorround" holding glass, it would craze but not fly apart.

seems to crumble over its whole area in a characteristic honeycomb pattern. In auto rear windows, this actually amounts to a safety factor, since the honeycombed remains will give only superficial cuts, unlike the lethal knives of ordinary shattered glass.

"Tempered auto glass breaks so rarely," he explained, "that very few motorists have ever seen what it looks like. So when newspapers run pictures of the dramatic result, it isn't surprising that talk about 'mysteriously decomposed or disintegrating auto glass' gets about. The important thing to understand is that this doesn't happen to windshields or side windows, but to rear windows."

"What can make it let go?"

"Tempered glass fractures under severe impact or distortion. One theory is that it sometimes happens as a result of sudden temperature change. This may not affect the glass directly, but may

cause expansion or contraction of the steel car body. If the glass isn't properly installed, this might put twisting or racking force on the glass. You understand that this doesn't happen very often. It needn't; if it happens only now and then, and if pictures of it are published, it will naturally seem strange to people."

"What about the pitted windshields?"

"I don't have any first-hand information. But I can say that I haven't heard of anything beyond what might be caused by routine local conditions—stone damage, youngsters with slingshots, and the like. Better talk to the people at Lib-

bey-Owens-Ford and Pittsburgh Platethey're the really big outfits in auto glass."

The Toledo story. A couple of plane hours out of Washington brought me to the Toledo empire of Libbey-Owens-Ford—and quite an empire it is, since the company has long been General Motors' prime supplier of auto glass, among other

Guess which of these enlarged pockmarks are lab made



These typical pocks, enlarged about 40 times, were found on windshields in Scattle area.



Similarly enlarged pocks were made by Pittsburgh Plate by hurling tiny stones at glass.

things. I was shown through a remarkable number of glass doors to the offices of L-O-F spokesman James Ashley.

"I hope you're not going to ask about pitted windshields," he said wearily.

I learned that L-O-F laboratory scientists and field men had found absolutely nothing in the pitted windshields shipped in from pox areas. Nothing, Ashley told me, beyond marks of the sort typically produced by gravel impact or the like.

In some communities where the pox had hit hard, such as Canton, Ohio, investigation indicated that vandalism was a major factor—this being the term for what happens when the juices of spring flow through adolescents armed with air rifles. In many cities published stories of "disintegrating" windshields were accompanied by photographs of honeycombed rear windows.

Radioactivity, the dominant baunt of the decade, turned up in many rumors. But L-O-F technicians couldn't find the slightest evidence that the pits were "hot," and they took comfort in a spiking demal by AEC experts at the Argonne National Laboratory, Another epidemic tale, that pitting was caused by defective glass, just didn't make scientific sense: there had been no change in materials or manufacture, and field reports showed no suspicious concentration according to make of car or year of manufacture.

"The hard fact," Ashley concluded, "is that this seems to be wholly psychological. Certainly there are some marks being found on windshields. But there always have been, If after hearing rumors you hurry out to examine your own windshield closely, you stand a fair chance of being able to find some 'pits'."

The Pittsburgh story. At Pittsburgh Plate Glass, supplier to Dodge, Plymouth, De Soto, Chrysler, Ford and some

[Continued on page 218]





Streamlined Motorbike, Stout Nerves, Win Tough British Race

The daring sidecar rider in this new English motorcycle almost had his ear to the ground on curves but it was worth it. The vehicle, a Norton Watsoman, won the

Racing Club's 1954 sidecar championship race. Another streamlined combo that made its debut recently had its engine mounted behind the driver's bucket seat.



FAIRY tales, recipes, riddles, stock-market quotations, weather and road reports are all available at the spin of a dial to Viennese with telephones. All they need to know is the number they want. There are 15 such services altogether.



Children (right, above) quickly eaught on to the correct number for stories, which change daily.

Grete Zillner (left, above) records most of the talking on tapes, located on a single board in the telephone exchange.



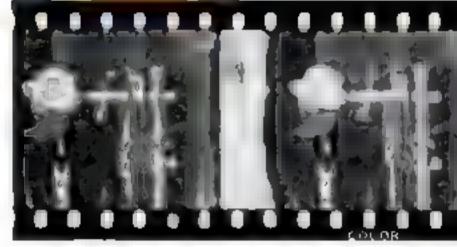
Camera-Toting Copter Tags Sports Cars on Stiff Movie Run

Supposedly racing from Canada to Mexico, the sports cars above never got far from Reno, Nev., though some hit 100 miles an hour. Driven by professionals, includ-

ing Howard Darrin and Chuck Tatum, who also built them, the cars were making scenes, mostly filmed from a helicopter, for a new movie called "Johnny Dark."

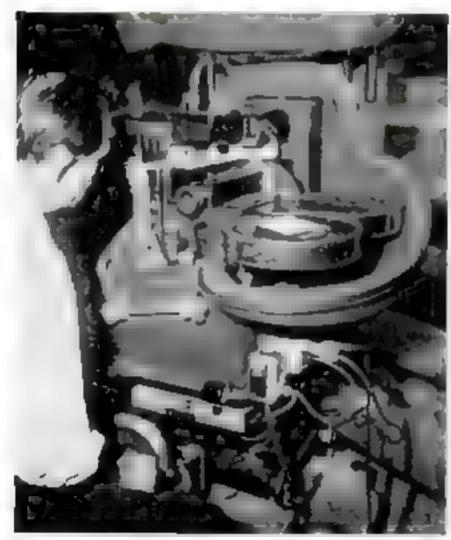
Hollywood Now Shoots

Turning film in the camera turns the trick that gives VistaVision extra-large negatives for clearer and brighter big-screen projection.



BING CROSBY sat hunched in an easy chair intently watching a gigantic image of himself dancing across the world's largest indoor screen. Stretching across one end of a Hollywood sound stage, the screen was big enough to display 13,000 19-inch TV images.

What Bing witnessed were scenesrushes-from the previous day's shoot-



FILM runs past VistaVision camera lens sideways. Thus, frames are as high as standard ones are wide—that is, negative area is much larger. Reduced to normal size, film can be projected on big screen without graininess.

ing of Irving Berlin's "White Christmas," first picture made by a new bigscreen process called VistaVision.

What does this process mean to movie fans with Bing blown up a couple of dozen times life size?

"Whee!" exclaimed a blond steno who had wandered in, "His eyes are blue!"

Yes, you can see the color of the groaner's orbs now. But the new process promises to accomplish far more.

VistaVision can be played on any movie screen in the world. It requires no trick lenses or expensive sound systems in the theater. A projectionist simply threads a standard 35-mm, print into the machine, snaps on the light—and the show's on, in any size and practically any dimension he desires.

Larger Image on Same Negative

Here's how the picture is made, as illustrated by "White Christmas," which you'll be able to see late this year. You build a set slightly wider than usual. You light it as usual. You focus your camera on the scene and start cranking. Only the camera is radically different. The film runs sideways instead of down. And, although the same 35-mm. stock is used, the image on the negative is 2% times bigger.

You cannot run this film through a projector and get a satisfactory picture,





because all the characters would seem to be walking on the wall. So you rotate the film 90 degrees, while at the same time reducing the image to a standard 35-mm. negative, and everybody comes out right side up. That, in a nutshell, is the principle of VistaVision.

Until two years ago, small negatives

provided good prints for projection onto small screens. Then Cinerama touched off a wave of big screens. More than 4,000 have gone up, and more are being installed every day.

Often the big picture is simply blown up from a standard 35-mm. negative and contact print. The pictures look somewhat better, but, says John R. Bishop, head of Paramount's camera department, "the negative is the bad boy. We simply can't store enough detail in its small size. Sit close to the screen, and your eyes tire. Too fuzzy, too grainy."

Detail for the Widest Screen

As big screens blossomed, Bishop began searching for a way to produce an image large enough to fill, with sharp detail, the widest screen that might be built. A larger negative was needed. But

how could it be handled in the camera?

Bishop first got the idea of VistaVision from the Leica camera. Alstill though the Leica also uses 35-mm, film, its lens exposes an area double that of the image on the movie film, Turn the Leica sideways, and the picture has about the same proportions as a big theater screen.

Fine so far. He then began searching for a movement that would transport

the eight perforations in a double frame past the lens. He remembered an old color system built in 1926 by William P. Stein that exposed two 35-mm. color negatives to form a single projection picture. Bishop obtained one of these movements, installed a Leica lens in a Mitchell camera, turned the camera on its side, and shot a test. It worked.

Luckily for the producers, no radical changes are required in set building. Artists compose and balance a set in a ratio of 1.66 to one-two-thirds wider than high. This brings it closer to the proportions the eye naturally takes in.

Because VistaVision is primarily a process of shooting on a large area and reducing to a smaller area, the chemis-

try of fine-grain printing, eliminating fuzziness, permits screens to go up and up in size.

Unlike Twentieth Century-Fox, which spent large sums on CinemaScope before the cameras began rolling on "The Robe," Paramount laid out only trivial amounts reworking camera mechanisms. Convinced that what's good for the industry is good as well for Paramount, they've made camera plans and techniques available to all without cost.

The other afternoon I saw the first

results of VistaVision, Bing and Danny Kaye cavorted in colorful dance number. The first picture was what Loran Ryder, the studio's sound chief. calls "postagestamp" size. That's a nine-by-12-foot picture that lots of movie houses display even today. A change in lenses, and up came dance sequence 23 feet wide, another 30 feet wide, then another 61 feet across. This was the

largest square footage ever shown. Yet as the picture continued to grow sideways, I noted that it continued to grow in height, and staved clean and sharp.

As the shots of Bing Crosby and Danny Kaye expanded, the dancers also grew in size. But, and this is important, more foreground and background came into view at the top and bottom of the screen. The human figures did not "grow" as rapidly as the over-all scenes

As for the actors' reaction to VistaVision, "I do what I always do," Bing told me, "and the cameraman tells me whether I'm in the picture or out."

It's just about that simple.—Andrew R. Boone.

WHERLING his truck-trailer rig on a new route, Joe hit a winding, norrow detour. Just past a sharp reverse curve, a low railroad underpass made him brake to a stop. To his dismay the posted clearance was three inches less than the total height of his rig. To turn around was impossible, to back along the winding road unthinkably dangerous.

A boy on a bike came up and helped Joe ponder his dilemma. Shortly the boy gave Joe an idea. Ten minutes later the rig was rolling again.

... How Come?

ANAWAR: Knowing the unys of tires to you had beet o for the boy told los to the huge truck and tot smiles tives to the whole sig by trailes tives to tooos the whole sig by these inches.

Individual Radio Sets Tell Museum Visitors What They Are Seeing



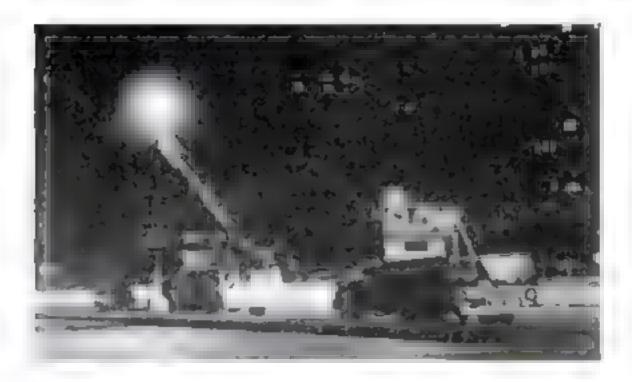


A VISITOR to the American Museum of Natural History, New York City, may now be wired for sound as he enters the building. He may, that is, rent a small, earphone-equipped radio receiver on which to pick up continuous explanatory broadcasts as he strolls through parts of the museum and sees the exhibits (right, above). The receiver, on a shoulder strap, weighs only a pound. It has only one knob and that

controls volume. The earphone for men is on a headset like a telephone operator's. The earphone for women is on a stick that is held in one hand.

Behind the scenes, five record players (left, above) send out talks to five museum halls equipped with loop antennas. They broadcast brief descriptions of exhibits.

The American Museum is said to be the first institution to use radio guides.

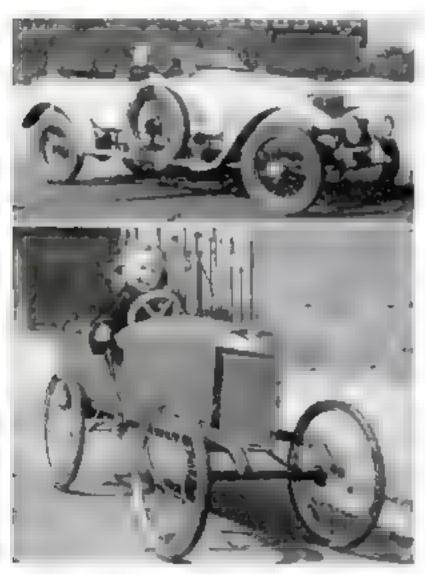


Motorized Blinker Protects Repairmen

When the Broadway Maintenance Corp., which takes care of 250,000 New York City street lights, sends out a service truck at night, it sends along another truck to park behind and protect it. On the second truck's cab is a two-by-six-foot electric sign that blinks a big "SLOW" at oncoming cars.



The writer of this article, Laurence Pomeroy, is widely respected abroad as the foremost British "car critic." The author of several definitive books on high-performance engines, he is Technical Editor of the British weekly, The Motor. Not just a desk expert, he has driven almost everything on wheels, and has designed and manufactured a number of special superchargers. When he visited Detroit and New York this year, PSM invited Mr. Pomeroy to give his impressions of U.S. automobiles. Reading his pungent criticisms, Americans may gain new insight into the somewhat eccentric deportment of foreign vehicles on our own highways.



At the wheel of a 1914 Vauxhall (upper photo), Pomeroy practices his preachment that good old cars need never die. Though 38 years old at the time of the picture, the car was still fun to drive, he reports. The little girl is his daughter Pam in a model of the 1913 Vauxhall, Laurence Pomeroy's father was chief engineer for Vauxhall.

A Britisher

This sharp-eyed English expert delivers a pointed report on a tour of the U.S. auto industry.

By Laurence Pomeroy

NO ONE who has spent a day at the General Motors proving ground or technical center, or who has seen the acres of research buildings put up by Ford in recent years, can fail to be impressed by the enormous effort that goes into the products of one of America's biggest industries.

To a European the size of the establishments are staggering. It almost passes belief that Ford employs 6,000 technicians—whereas a twentieth of that number would be on the high side for trans-

atlantic producers.

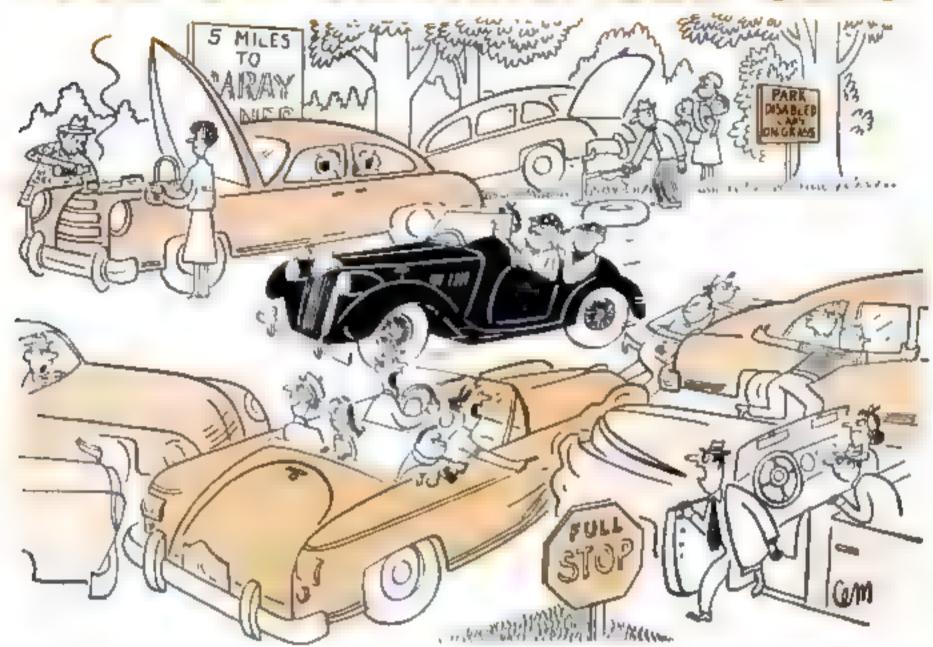
To carry the paradox further, some of the most famous cars in the world—Rolls Royce, noted for silence and long life; Mercedes Benz, noted for speed and solidity; Alfa Romeo and Ferrari for allaround brilliant performance; and Jaguar, which challenges Cadillac for looks and value—are in many cases produced by design teams that do not add up to even 100 persons. So on the face of it, at least 20 Americans are needed to do the job of one Englishman or Italian!

For Americans-All the "Gimmicks"

The matter is of course by no means as simple as this. For although a fair percentage of American employees are there to support a complex (one may think overelaborate) organization, most are doing a task not attempted overseas.

This is to incorporate in the volumeproduced, low-priced car of today all the conveniences and "gimmicks" that were confined to the custom-built car of 1949. By contrast, in Europe 90 percent of the cars are made as simply and cheaply as possible. So, whereas a Chevrolet will

Tees Off on American Cars



"Detroit puts everything into an automobile except economy and fun."

cost a third as much as a Cadillac, the cheapest British car may be bought for a fifteenth of the price of the dearest.

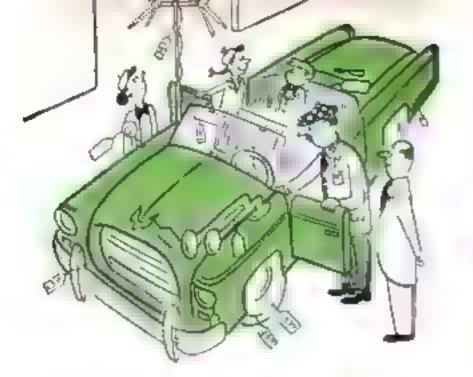
Quite obviously the introduction of automatic transmissions, power steering, power brakes and power seats on really low-priced cars depends on a vast number of engineering man-hours. A dollar saved by shortening a gear shaft will in a year cover the salaries of a hundred quite highly paid designers. It is this that has led to the formation of huge design teams that do not solve problems so much as trample them to death.

But the results are there for all to see. The 1954 American car is a magnificent response to the desires of the 1952 buyer. Still, it utterly neglects two primary requirements of transport as we have known it for some thousands of years.

These are economy and fun, and it is remarkable that Detroit puts everything into an automobile except these two things.

The American public showed its contempt for economy transport when it stopped buying the Model T. The vast gains in productivity in the past 25 years find expression in the 100-hp., 3,000-lb., 16-m.p.g. cars making sales in millions a year. A 60-hp., 2,000-lb., 22-m.p.g. car would save the owner as much as \$600 in first cost, possibly \$100 a year in running costs—or say \$250 a year.

And what does the family really get for the extra \$250? A squashed six seats in place of a comfortable four. Space and power that will be appreciated on the yearly vacation; but this is only two or three weeks in 52. Social equality with the neighbors; but \$250 a year will pay



"What does the family really get for 8250 more a year?"



". . . a squashed six seats in place of a comfortable four."

for a larger house, new furniture or quite a sizable locker of new clothes. Or in terms of money saved over 25 years, more than \$6,000 could be salted away in the bank

To this the present-day producers have their answer, and it seems a conclusive one, Americans have often had the opportunity of buying small and simple cars, both foreign and domestic, and they have rarely done so in quantities that have prospered the maker or importer. In other words, the all-important buyer,

the wife, thinks a big car well worth \$20 a month of her spouse's salary,

But does she realize how much her

choice contributes to the traffic tangle, to taxes and to the cost of hving? Two American cars, with two car lengths between them, occupy 70 feet of road; two European types only 50 feet. And in width, four American cars with a foot on each side take up 35 feet and four small cars only 28 feet. Who pays for this extra_roadway?

None other than the motorist!

Disregard of economics is also shown by the preference for low first cost at the expense of long life. Not everyone will enjoy, as I do, setting off for a 100-yearold house in a 40-year-old car wearing a 16-year-old topcoat and a 160-year-old vest. But the war has shown Europeans that car life can be extended over very long periods; indeed, more than half the cars on British roads today are more than 15 years old and still going strong.

But if the American buyer has really decided not to worry about motoring costs, why does he so utterly neglect the possibility of getting real fun, or pleasure, out of the hunk of iron and steel that is probably his second most costly possession?

With all past forms of transport camels, horses, chariots, gigs, sailing vessels and cycles—a few people have found

a source of pleas-

of pleasure in competition driving

HEGH LINEBALK

HINT TO AN UNHANDY HANDY MAN

A man can improve most jobs he fills-

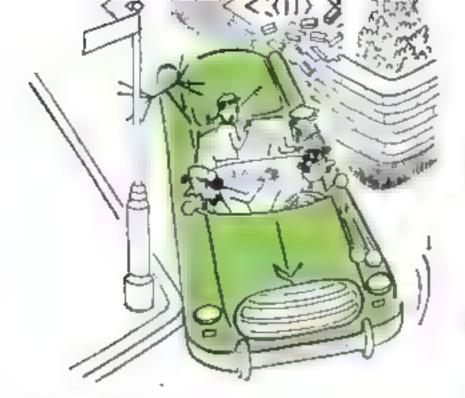
By simply applying his hobby skills.

ure based on applied skill, courage and judgment. In Europe many still do find this kind

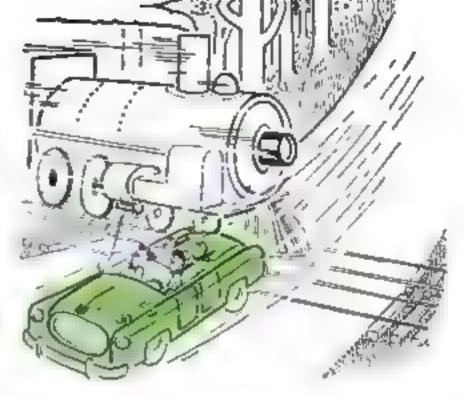
More important, and an experience that can be enjoyed any day, is a feeling of harmony between man and mechanism, provided only that the machinery is responsive to the most delicate touch. (We know that automatic gear change and power steering do a fine job; but then so does a hand grenade thrown into a river, if weight of fish caught per day is the only measurement of enjoyment.)

A Model for Detroit to Emulate

It is not necessary to build costly cars to provide pleasurable motoring. In fact, one of the cheapest British cars is best taken as an example of how steering, cornering, steadiness and stopping can



"Designed to operate only in a straight line . . ."



"Brakes may prove unresponsive if used repeatedly."

be brought to a height of excellence that not one Detroit engineer in a thousand has ever experienced!

Here the rapidly growing (if still percentagewise tiny) sports-car club can change the situation. There are today at least 100,000 Americans who know what real motoring can be, whereas 10 years ago there were not a thousand. That Detroit itself detects heightening public interest in motoring for motoring's sake (and one may well be going some place at the same time) is shown by the advent of the Ford Thunderbird and the Chevrolet Corvette.

For City Streets, Non-Stop Driving

It is conceivable that the technical developments built into these special models may affect future designs of American passenger sedans. The current American car appears to have been designed to operate in two conditions only. These are traveling slowly in a straight line in city streets, and traveling at a uniform 55-60 m.p.h. on open highways free from curves or stop signs.

These conditions may fairly represent

perhaps 90 percent of the motoring for 90 percent of American drivers. But there are always exceptions, and it seems to me that all too frequently such exceptions may result in serious accidents.

The relaxed driving conferred by the straight-running characteristics of American automobiles is won at the expense of very slow response to the helm in time of emergency. As a result, in the exceptional American conditions that represent normal running in Europe, it is impossible to steer an American car out of an emergency. Low brake-pedal pressures are gamed on small brake drums by self-servo shoes coupled with a big mechanical advantage for the driver. Although the brakes may respond well on a first application they prove quite unresponsive if the driver uses them repeatedly, as for driving downhill.

The American car demands a high technical price for acceptability in a mass market dominated by feminine values. In the outer world, with more masculine standards, it may fail to prove acceptable even if currency regulations should make foreign trade easier. END

--- Want to Sass the Expert? -----

The foregoing comment on U.S. automobile design will, PSM's editors suspect, stimulate many readers. Some will say, "Hear, hear!" Some will say, "Could be." And no doubt some persons will want to punch Mr. Pomeroy on the

snoot. For the five most interesting letters, no more than 150 words long, on this article, received by August 1, PSM will pay \$25 apiece. Address The Editor, POPULAR SCIENCE MONTHLY, 353 Fourth Avenue, New York 10, N. Y.

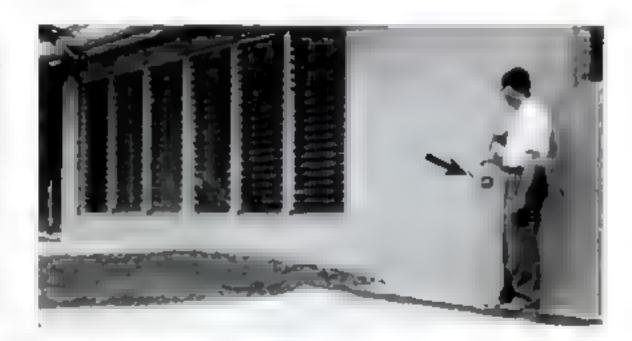


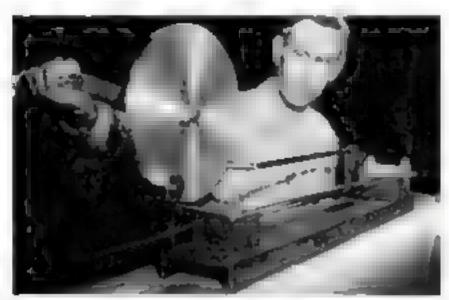
Armored Landing Craft Shields Marines Hitting the Beach

THE Leathernecks are protected on top as well as sides in their new landing craft, the LVTP-5. Fully loaded, the scowlike tractor rides low in the water while personnel peer from six lookout ports set in the deck. The opened hid of one of these ports can be seen at the top of the craft, above the unloading ramp.

Rain Closes Windows Until Weather Clears

Is a drop of water hits the grid marked by the arrow at right, the house windows shut tight until the grid dries. Then it reopens the jalousies. The unit, similar to those on convertibles, is made by Micro-Moisture Controls, 3162 N. Miami Ave., Miami





Slicing Machine Cuts Wire

With this tool airplane assembly workers slice wires to size instead of hand-snipping them. In 18% hours they can crank out 67,824 pieces—a job that used to take 452 hours. T. J. Kittrell, bench mechanic of Temeo Aircraft, Dallas, devised the machine.



Plug-in Filter Clears the Air

STATIC electricity—the same force that makes your nylon shirt crackle—has been harnessed to relieve hay fever. This portable filter sucks room air between charged plates that pick up pollen, dust, smoke, lint. Raytheon plans to market it next fall.



Sunshine Becomes Electricity

Strips of silicon the size of razor blades yieldmore power than an atomic battery.

der this summer's sun. It's about half the size of this magazine, and it "taps" sunlight for electricity. It yields enough power to operate a transmitter, run a little motor or make a phone call.

Directly, instantly and efficiently, it transforms solar energy into electrical power. When light shines on it, you can use it just as though it were a dry battery; when the light goes out, it stops. It may never wear out.

On top of a telephone pole, it could be used to convert sunshine into power for the telephone line. It works on artificial light, too. Recently its inventors turned a spotlight on one in a dark room and made enough electricity to run a small motor that turned a toy Ferris wheel

Credit for developing this astonishingly simple way of turning daylight, which is free, into electricity, which we usually buy, goes to a physicist, a chemist and an electrical engineer on the staff of the Bell Telephone Laboratories. The batteries which they showed to the National Academy of Sciences this spring delivered millions of times as much power as the atomic battery that was demonstrated a few weeks earlier (PSM, Apr. '54, p. 112). The makers of the solar battery believe, moreover, that its efficiency probably can be doubled.

Their discovery grew out of their study of semiconductors of electricity, and is based on a "p-n junction," which is used



THIS IS ONE OF THE FIRST solar batteries ever made. It consists of strips of specially treated silicon, which are connected together and mounted in plastic.



THE THREE INVENTORS of the solar battery are (left to right): G. L. Pearson, a physicist; D. M. Chapin, an electrical engineer; and C. S. Fuller, a chemist.

in transistors. The "p" stands for positive, the "n" for negative, and the junction is a barrier between parts of the material that react oppositely. In this case, the material is silicon—a light, abundant element that looks metallic and is found in common sand.

First, the silicon is purified until the ratio of nonsilicon atoms in it is 1 to 10,000,000. Impurities are then put into it. These create a surplus of electrons throughout the stuff.

The next step is to treat slices of silicon in such a way that, instead of a surplus of electrons, there will be a scarcity of them on the surface of each slice. This is done by heating the silicon in a tube containing a different kind of impurity. The two different impurities cause the silicon to react differently when light strikes it; its surface becomes positive and its interior negative.

Tmy wires then are attached to the surface, and to the interior of each slice, and electricity is drawn through those wires whenever the silicon is exposed to light. By connecting many such slices together, 50 watts of power per square yard of surface can be drawn from sunlight.

Previous, comparable devices—thermocouples and photoelectric cells—have not converted more than one percent of

light's energy into electricity; this new device utilizes six percent of the light. This compares favorably with the efficiency of steam and gasoline engines.

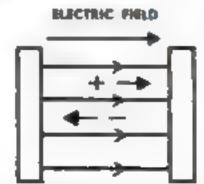
First Use for Telephones and Radios

The scientists expect these remarkable new batteries to be used first for rural telephone lines and low-power mobile radio apparatus. But many more uses may be found for them, Conceivably, at least, a roof built of strips of silicon will someday convert the sunlight shining on it into electricity to run the air-conditioner in the basement. The cost would be prohibitive now, but prices are manmade figures that men have often remade.—Volta Torrey.

· · · · HOW THE SOLAR BATTERY WORKS

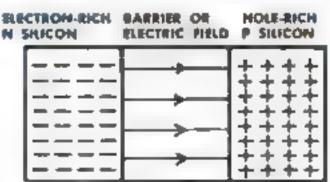
SUN DE ELECTRON

When light is absorbed by a salicon crystal, it liberates negative and positive charges inside the crystal. The negative charges are called electrons, the positive charges are called holes. Both electrons and holes are free to move around.



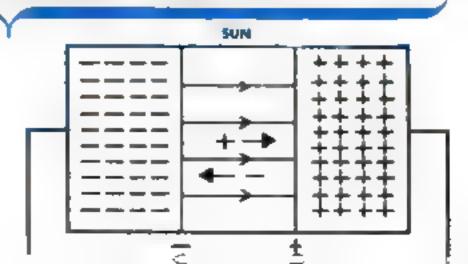
An electric field exerts a lorce on charged particles causing them to move if they are free. The force moves holes in one direction and electrons in the opposite direction.

SIUCON P-N JUNCTION



in a thin barrier at the junction between an electron-rich in region and a hole-rich piregion in a selicon crystal, a strong built the electric field exists which keeps the electrons in the n side and holes in the piside.

When light is absorbed, liberating electrons and holes in the barrier region at a p-n junction, the built-in electric field forces the holes into the p side, making it positive, and the electrons into the n side, making it segative. This displacement of the newly freed charges causes a voltage to appear between the parts of the crystal, a voltage that is a source of electrical power. Thus light energy is converted into electrical energy.

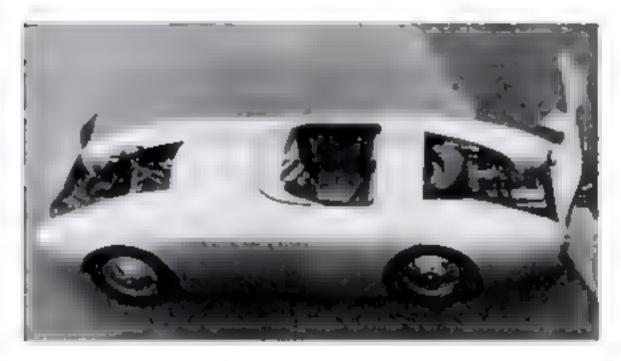


50-M.P.H. Racing Car Made for Kids

When six-year-old Franco Patria of San Remo, Italy, gets behind the wheel of this miniature racer and guns the motor, he can whoop around a track at 50 miles an hour. But don't let your youngster get too enthusiastic. It would lower the family bank roll almost \$1,000 to put the expensive toy in your garage. Franco's Pop, Piero Patria, makes the car.

▶▶► Mass production of U.S. cars depends on precise timing. In GM. plants, for instance, it's not unusual to have on hand only a day and a half's supply of parts. Fast transportation from supply sources cuts storage—bits and pieces come in, cars go out.



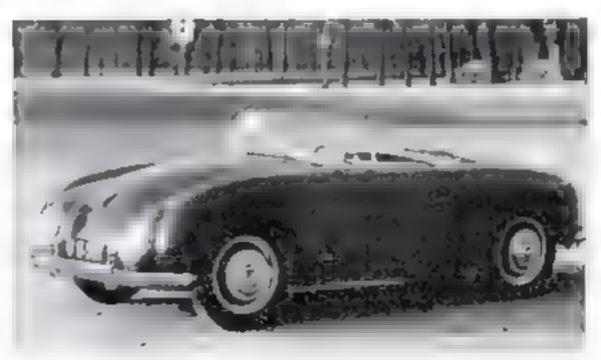


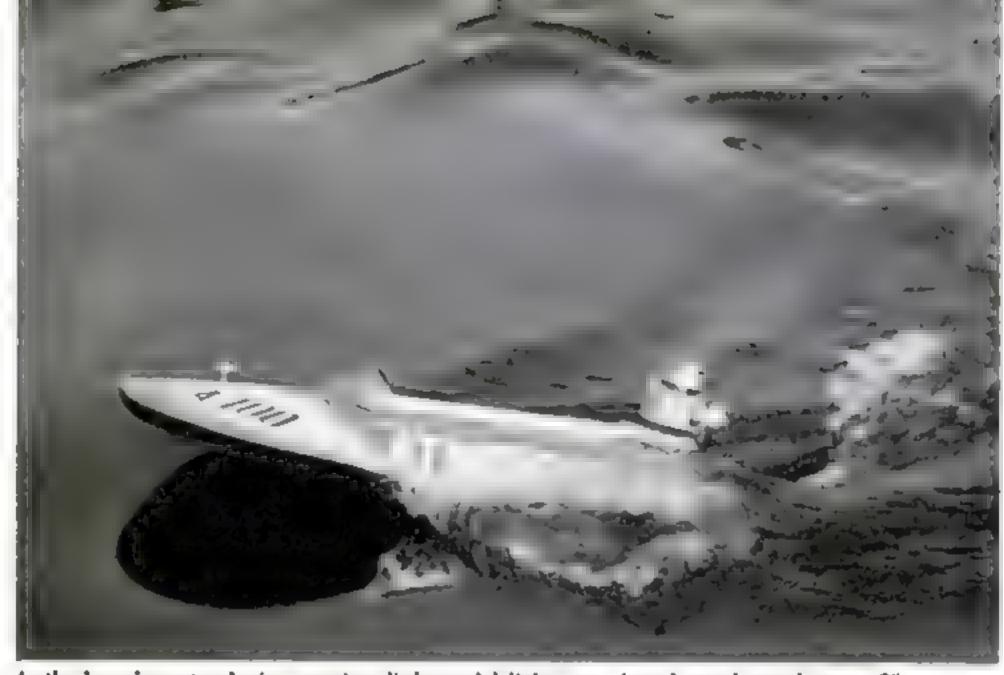
Auto Has Engines at Front and Rear

The sports car at left lifts two bonnets to show twin power plants—stock engines that deliver 72 hp. each. L. J. Fageol, bus manufacturer, reworked the Porsche. He says two engines prevent spin when cornering at high speeds. In shakedown race, car placed second.

Volkswagen Souped Up to Hit 100 M.P.H.

AUSTRIANS say their souped-up Volkswagen (right) does 100 m.p.h. when hitting on all four cylinders of its air-cooled, rear-mounted engine. The aluminum sportscar body rides lower and is shorter and wider than the German original. The car sells for \$3,000 in Vienna.





As the bow drops to planing position, little model lights out. Actual speed may be near 20

Tiny Outboards Howl Like the Big Ones

If A small but perfectly formed outboard hydroplane, only a few inches long but able to scream nastily, over-hauls you on the lake one of these days, there's no need to count your marbles. It's just one of the tiny new outboard models—latest adaptation of that incred-



OOPS! After a porpoise start, this model settled down to a fine high-speed run. Motor is often angled to drive boat in a large circle. Gas tank gives about a two-minute run.

ibly tough little power plant, the modelplane engine—that have been delighting duck-pond sailors this summer.

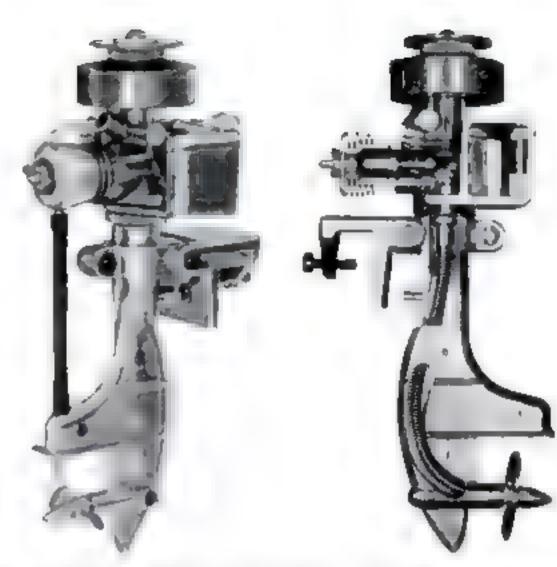
Weighing less than five ounces complete, such an outboard has a genuine internal-combustion engine. The bore is roughly the diameter of a lead pencil, the stroke about the length of the eraser on the end; the displacement a piffing 1/20 of a cubic inch. Despite these mouse-scale dimensions, the tiny two-cycle job spits out about 1/32 hp. at 14.-000 r p.m., which can take a 14- to 24-inch boat up to 12 to 25 m.p.h.

Fuel is a mixture of methanol, castor oil and other agents. Ignition is by glow plug, a bit of resistance wire that's electrically heated for starting. The engine then carries on by self-ignition, Die-cast parts of light alloy account for both the light weight and low cost—under \$10. Hobby shops are stocking, besides the engines, suitable hulls and hull kits.

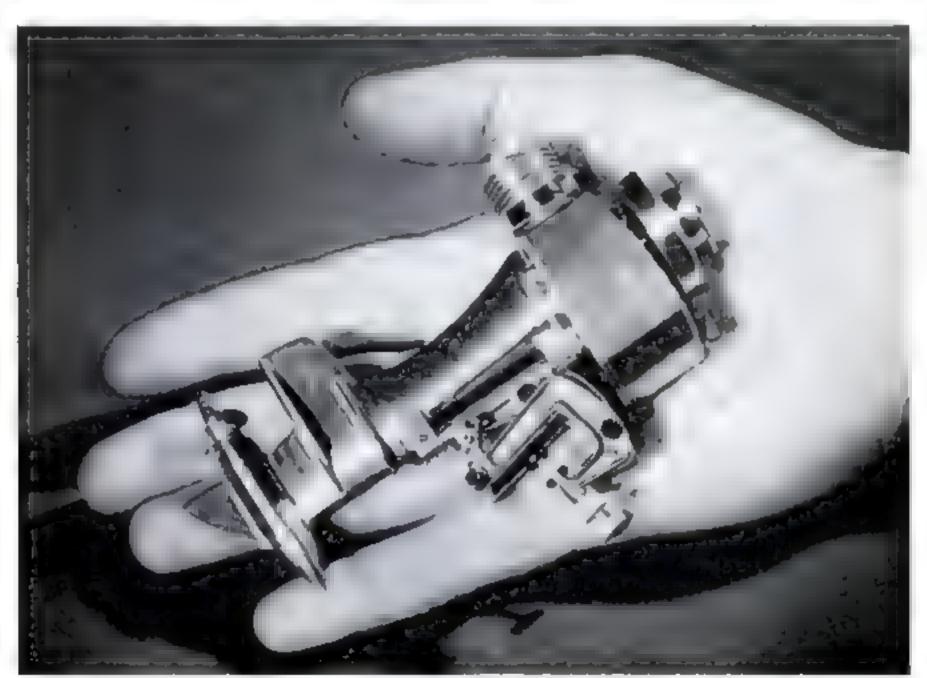
Cautious owners run their craft tethered; more daring sailors try trans-pond "free-flights" or big semicircular cruises. How do you stop it after a run? A cinch —just pinch the flywheel!—Jack Wilson.



m.p.h.; scale speed over 100.



WATER-COOLED version (left, above) gets its circulation from the pressure of water astern of prop. The air-cooled version (right) works well on open hulls. Note in cutaway engine that this make (Atwood Motors) uses a flexible shaft to get power to prop. Photos above are half life-size.



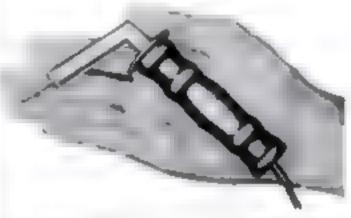
LIKE THE BIG ONES, some tiny kickers have two bevel gears in the underwater unit. This one, the Allyn Sea Fury, has rustless drive shaft and chrome-nickel bevel gears, driving a

high-speed prop less than an inch in diameter. Adjustable mounting bracket suits various transoms. Needle valve gives speed control: extra-rich setting slows up the engine.



Movie Projector Has TV-Like Screen Built In

What you see here is not a TV set with a tape recorder on top, but an 8-mm. movie projector with a built-in screen. It was exhibited at an international photographic show by the Vogt & Hartmann Electrical Co. of Mainz-Weisenau, Germany It sells abroad for about \$95.



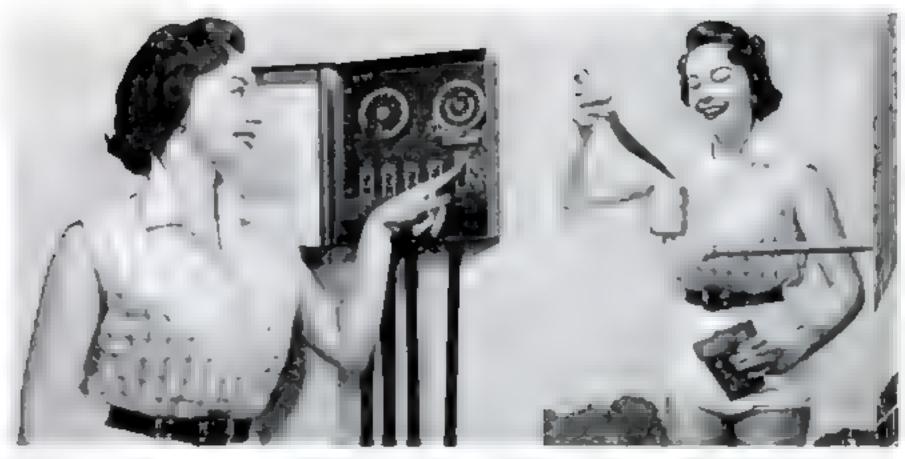
Soldering Iron Fits Paim

A NEW three-ounce soldering iron is no bigger than your hand. Hexacon Electric Co., 115 W. Clay Ave., Roselle Park, N. J., says its shape makes accurate work on small electronic equipment easier.



Vacuum-Cleaner Connection Lets You Inflate Pool Without a Puff

You can pump up this wading pool with your vacuum cleaner. The same device that adapts a vacuum hose to the air valves also fits the drain, so that the pool can be emptied through a garden hose. A built-in thermometer lets Mother check water before dunking Junior. Bilnor Corp., 300 Morgan Ave., Brooklyn, N. Y., makes the pool.



Automatic Control Waters Lawn Daily—Except When It Rains

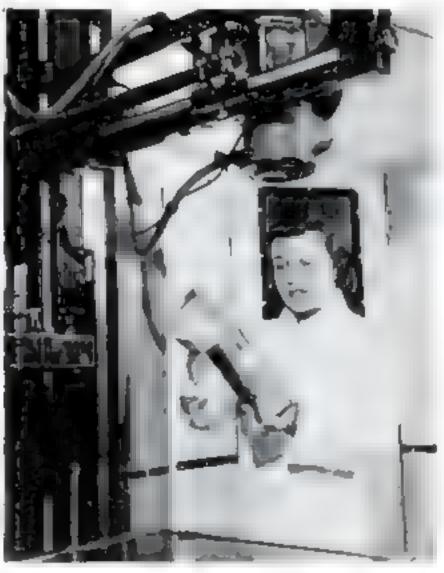
For 80 bucks you can get this automatic water boy to sprinkle your lawn every day—except when it rains. A clock (left, above), connected to your concealed sprinkler

system, turns the water on and off. But if it rains, a detector you fill with sand (right, above) stops sprinkling one day. Tork Clock Co., Mount Vernon, N. Y., makes it.



Professor Tells the Marines

A COLLEGE professor has gone and told it to the Marines. And of all things—how to use a bayonet. Prof. Armond H. Seidler, University of Illinois, has worked out a speedier bayonet technique that the Leathernecks are testing. That's the professor above showing a sergeant the new way.



Rare Element Generates X Rays

THE 10-pound X-ray machine above—about the size of a can of tomato juice—produces rays that put it in a class with the giant machine in the foreground. Radioactive thulium generates its rays and it needs no outside power source. The Argonne National Lab developed it



Something new was added to astronomy six years ago, when scientists discovered the first radio "star." Now they are . . .

Looking into Space With Radio Eyes

By P. A. O'Brien Cavendish Laboratory, Combridge

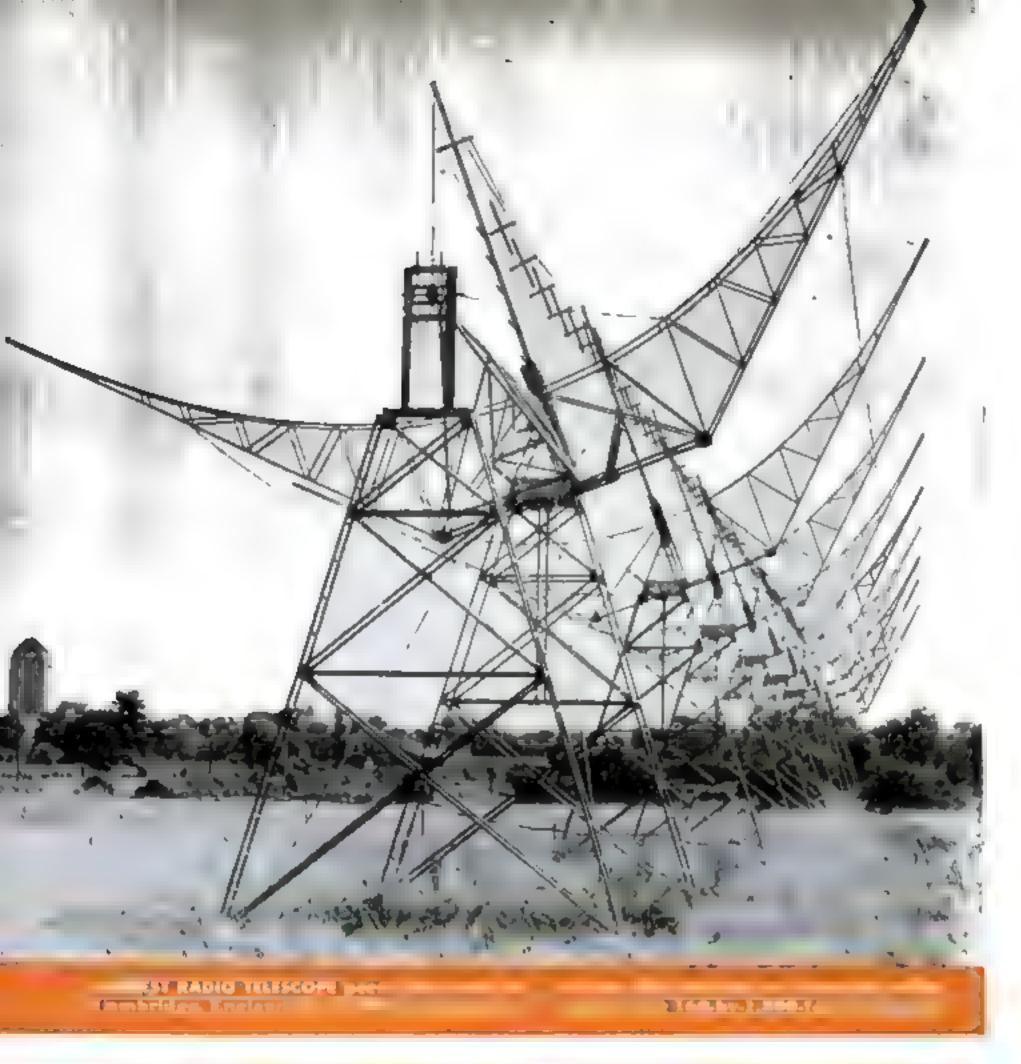
THE world's largest radio telescope has gone into service at Cambridge, England. Four parabolic sections, each 300 feet long and 40 feet wide, focus incoming radio waves upon antennas to locate radio "stars"—heavenly bodies that radiate at radio frequencies.

Radio astronomy is a new science. The first radio star was discovered in 1948. Now more than 200 are known; and Cambridge's new radio telescope should increase this number to about 1,000. Some actually are nebulae, but our sun, a faint radio star, is one example of a

true star among them. They account for mysterious hissing radio noises from nowhere on earth, which observers since 1931 had tried to trace with the directional aerials called radio telescopes.

A new window into space opens to radio astronomy. Now astronomers can observe the skies by radio waves, as well as by visible, ultraviolet and infrared light. All are electromagnetic waves, differing only in wave length. And radio waves that pass unhindered through the earth's atmosphere, ranging in length from % of an inch to 60 feet, offer a vast spectrum thousands of times as extensive as the visible one,





Because of radio waves' similarity to light, a radio astronomer can do far more than listen to static from the stars. He views heavenly objects and makes actual pictures of them by radio "light."

Seeing the Sun by Radio

How does the sun "look" by radio? Its disk swells in apparent size. According to the wave length used, a bright ring may encircle it—or its shape may startlingly change from round to oval.

Sunspots, dark to the eye, become far brighter than the rest of the disk, vividly flickering and flaring.

The sun looks bigger by radio waves because they come mostly from its atmosphere—which we see only in a total eclipse, when scattered light from the sun's surface forms the faint pearly white corona. Appearance changes with wave lengths because different ones come from different heights. Radio astronomy unexpectedly finds the sun's upper atmosphere at million-degree temperature, compared to its 6,000-degree surface.

Many radio stars outshine the sun in radio "brightness." A bright one in the constellation of Cygnus, the Swan, was the first discovered, by Australian ob-



HERE'S THE NEW WAY the oun looks, by radio "light." Bigger than by visible light (far left), it enlarges with increasing wave length, and its round shape changes into an oval one (far right on facing page). Another striking feature is bright ring observed at one-inch wave length. PSM actist's paintings are based on brightness charts obtained with radio tele-

scope and shown on smaller scale above them. Colors symbolize different wave lengths. This is an apt analogy, since changing the wave length alters celestial bodies' appearance much as a change of color filters does in varble-light observation. Note that visible sky is bright in daytime, "radio sky" always dark-a boon to radio astronomers.

servers. Soon after, the brightest of all was found in the constellation of Cassiopeia by Martin Ryle and his Cavendish Laboratory group at Cambridge.

Precise measurements at Cambridge of the two "stars'" positions were sent to Mt. Palomar, and photographs with the 200-inch telescope showed two strange objects faintly visible there.

New-Found Wonders of the Sky

The Cassiopeia radio star proves to be a nebulous, 100,000,000-mile-diameter Milky Way cloud in a chaotic state of turmoil, with filaments of gas moving at up to 1,000-mile-a-second velocity.

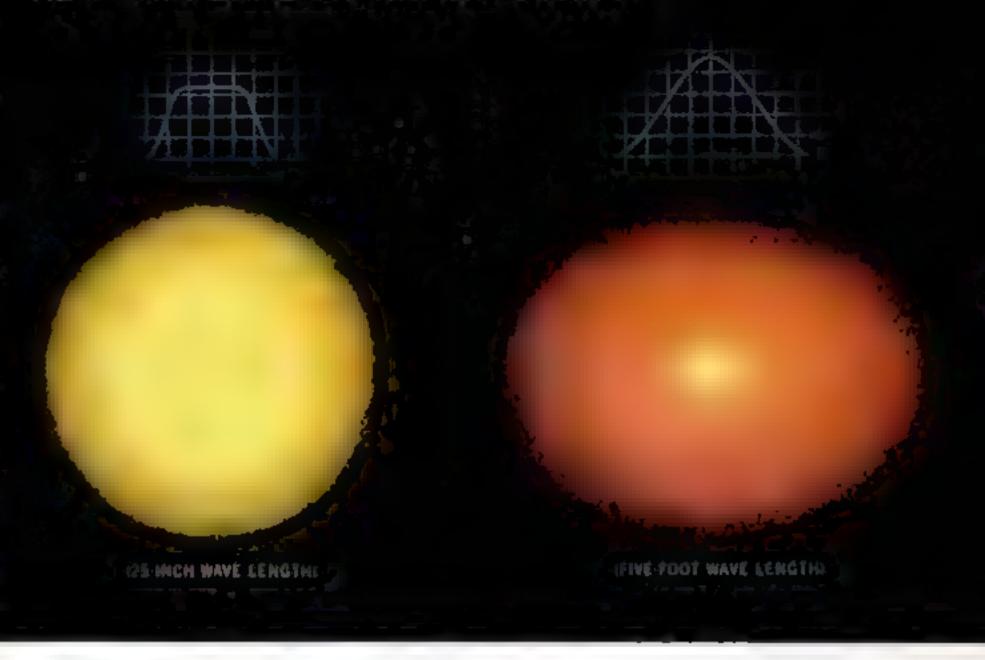
The Cygnus radio star looks like two distant galaxies in collision! Such swarms of stars might pass through each other unscathed, in millions of years; vast distances separating stars would make direct hits unlikely. But gas and dust clouds between stars could not escape collision. Most of the gas would be left behind at the scene, and heated to extreme temperature by the impact.

While radio astronomy led to finding these wonders, and more like them, some radio stars are familiar objects. The thirdbrightest radio star has been identified with the famous Crab Nebula in Taurus, the remains of a supernova or exploding star. Notably the brightest radio stars have one thing in common—diffuse gaseous matter in violent motion.

Day or night, the "radio sky" is dark and seeing is good for observers at radio telescopes. Neither clouds nor city lights bother them. But a handicap is their

[Continued on page 222]

AS IT APPEARS BY RADIO "LIGHT"



RADIO "LIGHT," by which radio telescopes see, resembles visible light that optical telescopes use. Both are electromagnetic waves, differing only in wave length. Diagram below shows where they fit into a continuous spectrum, with wave length increasing from left to right. Radio "colors," really invisible, are pictured as if like visible bucs. So far does radio hand exceed visible one in extent, that drawing cannot be to scale.







From horse opera to Carmen, color TV has already run the gamut of video entertainment. NHC has done regular color shows one at a time, while CHS has concentrated on a weekly variety program. More ambitious schedules are in the works.





costly (around \$1,000). They must be care-



Jabberwocky? No, these are just the



82 POPULAR SCIENCE



fully checked, as shown at left above in Westinghouse's Metuchen, N. J., factory.

Vertical-bar test pattern shows up horizontal (above) because receiver is on its side.

of Color Television

You, too, can tell a matrix from a killer with this glossary of the strange jargon that color TV is adding to our language.

By Martin Mann

HOST, snow and channel do not necessarily refer, anymore, to the supernatural, precipation or waterways, Television has given these words new meanings. And more such changes in our language are coming, for color TV brings its own lively jargon. Some are new words, others just new meanings. But all are fun to know—and help show

how this latest miracle of electronic entertainment is achieved,

Additive: Colors are created on a television screen by adding together different proportions of primary-colored lights. Red light plus green light gives yellow, for example. The lights are tiny dots of glowing colored phosphors on the face of the tube. This additive method is the opposite of the subtractive one used on

[Continued on page 212]



Truck maneuvers are taught with toys before the students try to perform in the big rigs.

of the school's trucks. Students learn their lessons in three first-class combos, on loan.

CLOSE INSPECTION and understanding of the truck's manards help trum the future driver to prevent trouble by anticipating it.



84 POPULAR SC ENCE

THREE HOURS IN THE CLASSROOM each day are followed by five hours of practice, two hours of study, Students' performance is rated daily.

They Learn to Drive Trucks at College

A new course has been added to N. C. State's curriculum: the fine art of piloting a combo.

"THE old-line truck driver is on his way out. The bewhiskered, liquor-drinking, cursing roustabout is going."

The speaker was addressing a clean-shaven, sober, polite group of young men. They were graduating from North Carolina State College's Driver Training School, This college, the only one in the U.S. that offers a four-week course 12 times a year in how to pilot a tractor-trailer, has given a special diploma to

more than 1,500 truck drivers since August 1949, when it began to teach them. Nearly all got jobs immediately.

The average student who pays the \$125 tuition fee is 26, has a ninth-grade education and has never driven a truck before. He learns how, and in addition is taught everything from freight handling to courtesy. The training is said to be "20 percent below the shoulders, 80 percent above." Veteran drivers without a diploma were at first skeptical of the graduates but now often copy them.

On these pages and the two following, you see a typical class at its lessons.—

Wesley S. Griswold.

DANGEROUS PRACTICE of crowding the highway's center line while crossing a bridge is pointed out to a pupil. He is told to brake his truck and politely let the road hog through-





MEASURING THE RESULTS of a demonstic test of driver reaction. With a detonator that do-

charges sellow powder on the road, the teachce finds out how quickly his pupil can stop



FAKE BREAKDOWN is an excuse to show the boys how to set out signal flags and flares. They are taught first aid, accident reporting.



LOW, OVERHANGING LIMB impresses on the driver the need for watching his headroom as well as front, lack and side clearances.



ONE OF THE HARDEST TESTS of skill and control is driving down this marked course, exactly

the width of one highway lune, without knocking one tennis ball off its perch.



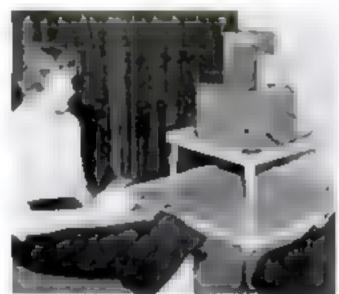
PARALLEL PARKING and other tricky exercises in parking and backing are practiced often on the State hair grounds, outside Raleigh.

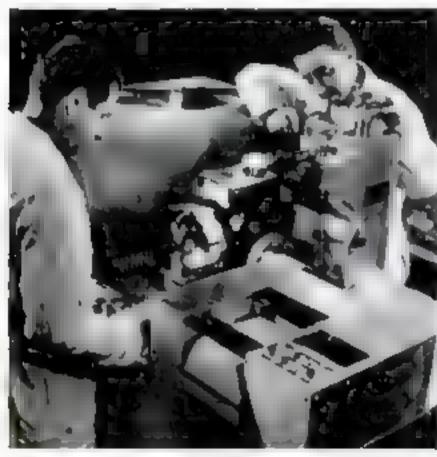
GRADUATION DAY is an occasion for feasing, and awarding of diplomas by Dean E. W. Ruggles of college's Extension Division. END



Observers Relax White "Ear" Listens for Plane

Observer Corps may soon do their watching indoors with the metal bubble at left on duty outside. It listens for an approaching plane; when the noise builds to a certain volume, a buzzer indoors (below) sounds an alert. The system is now under test by the Air Defense Command





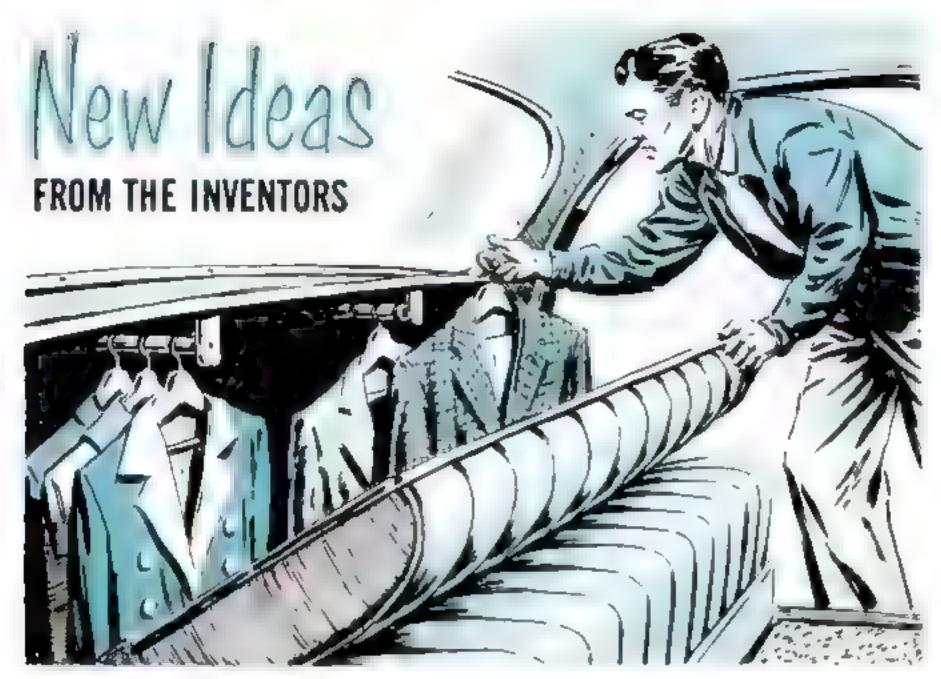
Electric Finger Measures Parts

ENCINEERS use this Probograph to keep hard-to-measure, uneven parts and gears accurate to within 1/10,000 of an inch. It has a feeler that slides over the surface of the part, passing a tiny current through it while a stylus records the measurements in graph form. The GE men above are using the machine to check jet-engine parts.



Radio Turns Red Light Green

That's an "electronic cop" on the door of the ambulance above. It will change red lights to green as the driver speeds toward intersections. Transmitting a beam to a receiver on each crossing light, the device cuts into the timing cycle to give the ambulance the right of way for five seconds. North American Aviation worked out the system.



1 Car Closet to Hold Clothes. The clothes you take on a trip wouldn't get so wrinkled if your car had hanging space for them between the trunk and rear seat. Clearing garments off their usual perch on

window hooks would also increase the comfort of back-seat riders and improve ventilation. Being out of sight, the clothing wouldn't invite pilferers, but a lock could be provided for extra protection.



2 Bridge to Adjust Bifocals. People who wear combination-lens spectacles might find it easier to get the right sections in focus if their glasses had sliding nose pads. Hooked under the regular bridge, this attachment would permit a wearer to raise or lower his lenses so he could see comfortably through either the lower or upper part.



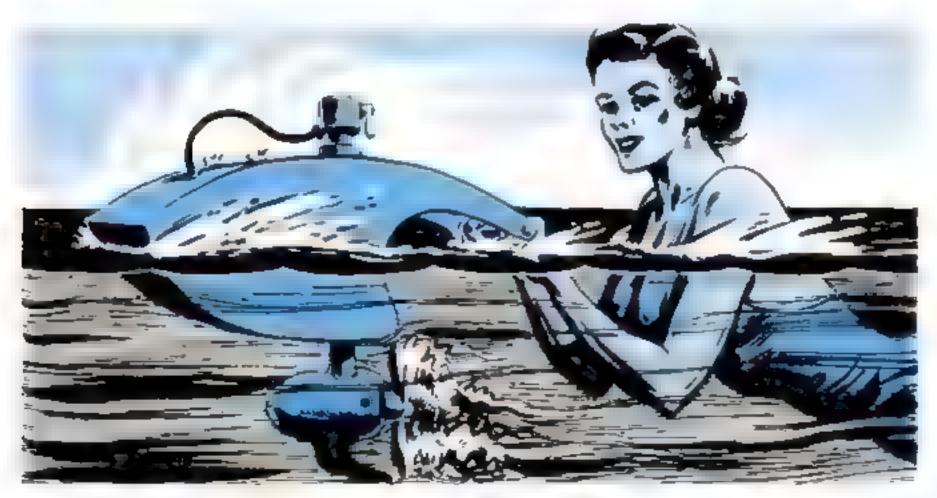
3 Can Key to Prevent Tangles. A scaler strip of the kind used on coffee cans couldn't get fouled if you rolled it off with a key like this. A flange that followed the top of the can would keep the strip coding evenly on itself. Shding the guard down then would force the strip off the open-end slot and ready the key for re-use.



4 Cushion to Air Minnows. Pumping air into a bait bucket, the inventor of this device notes, keeps minnows alive longer. Shifting your weight on this rubber seat pad would force air into the bucket. The pump would keep bait fresh while you drove to your fishing spot, and would save you the trouble of changing water while fishing.



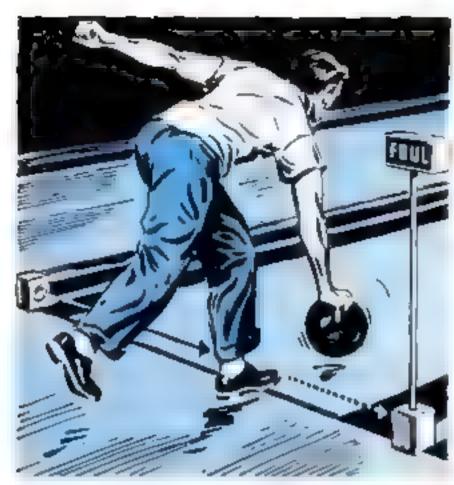
5 Signal to Warn of Soft Tires. A pressure drop in one of the tires on a dual wheel can't usually be detected by inspection because the good tire keeps the bad one from sagging. This warning system would use a separate roller to follow each shoe. If any tire became soft, its roller would tip and close an electric signal circuit.



6 Outboard to Tow Swimmer. A new kind of water sport may make its appearance if this personal outboard becomes popular. To get in the swim, you'd only have to hold onto a bar and let a motor zip you

along Shifting your grip would steer the "boat." A conventional battery-type out-board motor would be fitted to a watertight upper chamber. The chamber would serve to float the device and keep battery dry.

U. S. potents on these inventions have been granted to; I. S. Senk, Mullen, Nebe.; 2, R. F. E. Stegeman, Greece, N.Y.;
1. L. J. Lyle, Newton, Mus.; 4, J. J. Sunday, Detroit 5, T. J. Finan, Detroit; 6, J. B. Watter, August Falls, N.Y.;
7. W. S. Swift, East Ruchester, N.Y.; 8, G. E. Royal Lockhart, Tex.; 9, J. G. Fann, Arlington, Mass



7 Light to Guard Foul Line. A bowler may overstep the foul line without even being aware of it, but this photoelectric eye would not be deceived. If any part of a shoe interrupted the light beam, the foul sign would flash on. A built-in delay circuit would keep the mechanism from being triggered by passage of the ball.



B Drive-Ins to Air-Condition Cars. Cool or warm air might be piped to every car at a drive-in through underground ducts that would channel air from a central conditioning system to a hollow standard at each parking station. By lifting a flexible feeder hood into his car, a patron would connect his unit into the central system.



Ground Probe to Unhook Chute. This Air Force patent is designed to keep certain types of drop cargo from being overturned by drag of the chute after landing. A feeler probe that would touch ground a second or so in advance of its crate would set off a small explosive charge. This would sever the harness and release the chute.

Rebuilding a 1905 Car



By Gardner Soule

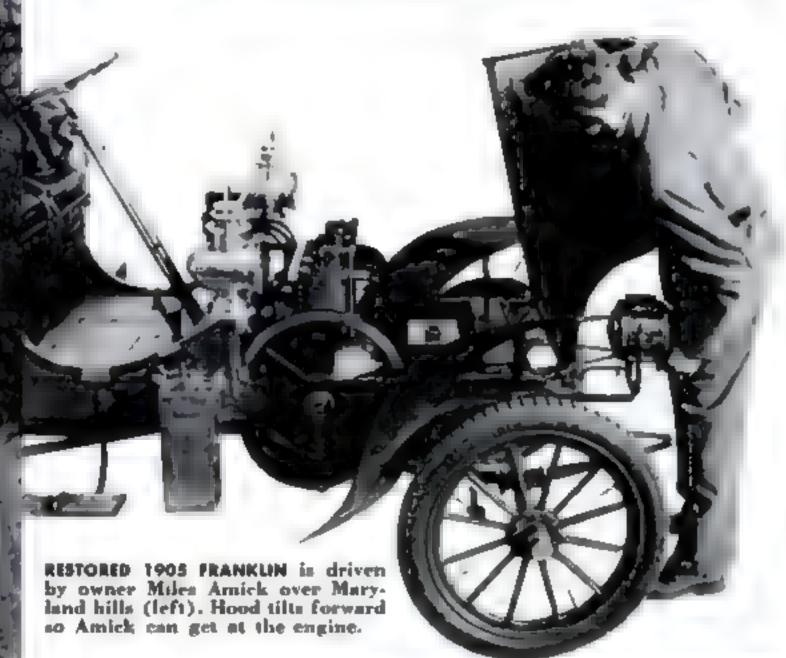
MILES S. AMICK, 28, of Cumberland, Md., has been driving around in a 1905 Franklin that took him three years to restore. The car has reached 42 m.p.h., or seven more than the 35 m.p.h. that the four-cylinder, 12-hp. vehicle was expected to deliver when it was new.

Today Amick is adjusting himself to the question that people inevitably ask of an antique-automobile owner. Some will watch the car drive right up to them, and then ask: "Will it run?" Others will inspect Amick's obviously brandnew tires (British Dunlop motorcycle tires, 28 by 3) and ask, "Can you get tires for it?"

Amick is also adjusting himself to the most common remark that casual spectators make about the Franklin: "My, they [the previous owners] took marvelous care of that car, didn't they?" The answer to this comment is in the photograph (at the right) of the car before it was restored. The engine was held in its approximate position by rope, The hood was held on with a piece of baling wire. And the alumnum crankcase had one corner chipped away

Taught Him 21 Trades

After restoring one tired and battered air-cooled Franklin, Miles Amick had so much knowledge left over . . . that he just naturally started on another.



There were chicken feathers on the car (hens had roosted on it), and cherry seeds in the crankcase (Amick thinks that squirrels dropped them there). Near as he can figure, the car ran for about five years, maybe between 1905 and 1910, then sat in a barn for the next forty.

To all questions and comments, Amick reacts with great calm. "The big thing that the job of restoring the car taught me was patience," he says. "I bave learned a lot of that. This is not the game for the chap who has to finish the job before he goes to bed at night."

Amick took six months to find and



WHEN AMICK bought the car, unused for 40 years, the motor had fallen over, was tied in with rope. Four-cylinder engine, called a "cross engine," sits sideways across the car.



1905 FRANKLIN has right-hand drive. Amick is tilting down the seat on left-hand side, thus opening a path to the high back seat. The leather took weeks of work to restore.

PEDALS, left to right, are the cutout, reverse and brake. The talk outside lever at left is the gearshift: foeward for high, back for low. Brass lantern is fueled by kerosene.

horse-trade for the car, back in 1950; had it delivered to him on December 23 that year, got right to work, and finally finished his restoration early in 1954. He can enter the car in this fall's antique-automobile exhibits, including the first one ever to be held for air-cooled cars like Franklins. This show is planned for Syracuse, N. Y., in September, before the Ghdden Tour.

Marble Workers Blasted Away

When you restore a car, you cannot simply leave it in a service station for a bit of engine and body work. Over the three years, Amick had to practice, or get other men to practice, 21 different trades. He had to be a carpenter and cabinetmaker to restore the toolbox and the coil box, for instance, and he had to call on marble workers to sandblast away the layers of rust. And that was only the beginning.

Amick thinks it was all worth it. People come from miles around to look at his car, and he gets a compliment or two along with those remarks that test his patience, Besides, Amick is a believer in air-cooled automobiles.

Franklins, which were built in Syracuse, N. Y., from 1902 to 1938, were the only mass-produced American air-cooled cars. But there were others, both U.S. and foreign, including, to name a few,

the Frayer-Miller, the Czech Tatra, the Fox, the Detroit Air-Cooled Twin Three, the Victor Page and the Adams-Farwell.

Although the depression finally put Franklin out of business, the argument over whether air-cooling or water-cooling is best has never died down. It is still so lively an issue, in fact, that there exists today an organization, The H. H. Franklin Club, of which Amick is president, devoted to air-cooled cars. In air-cooling, writes T. H. Hubbard in the club's news, "all the multiple attendant failures inherent in [water-cooling] are eliminated, along with considerable weight and over 100 moving parts . . .

"The weather conditions are of no interest to the Franklin engine which was always easy to start, quick to warm up in freezing temperatures and indifferent to extreme heat."

Hottest Car on the Market

Amick himself comments, "The hotter a motor can run, the more efficient it is. Water-cooled motors cannot exceed 212 degrees. Actually, anything above 180 degrees is punishing a motor and should not be done unless absolutely necessary But Franklins ran anywhere from 350 to 450 degrees, thereby making the Franklin a much more efficient automobile. The lack of water pump, fan belt, etc., also make the chances of mechanical

failure less than on water-cooled cars."

POPULAR SCIENCE MONTHLY asked Chrysler and Ford engineers why only water-cooled cars are manufactured today in the U.S. and got these replies:

From Chrysler: "... a principal reason why air-cooled engines are not used ... is their objectionable noise level."

From E. S. MacPherson, vice-president, engineering, Ford: "Briefly, I would say that a good, well-designed, water-cooled engine will always outperform a good air-cooled engine from the standpoint of: (1) silence, (2) smoothness, (3) power output, (4) usable spread range, (5) fuel economy, (6) oil economy, (7) power output and torque output per dollar of original cost." Mr. MacPherson admitted that most aviation engines were air-cooled but, he explained, their problems were different.

Taking the opposite side, Carl T. Doman, the last chief engineer for the Franklin company, is quoted in the Franklin club's Air-Cooled News:

"I am convinced more than ever that direct aircooling is the ultimate way by which a power plant should be cooled.

"With the return to V-8 overhead engines, air-cooling becomes a much simpler job. Furthermore, with the advanced production techniques, items which used to appear expensive to us in Syracuse are no longer considered to be expensive."

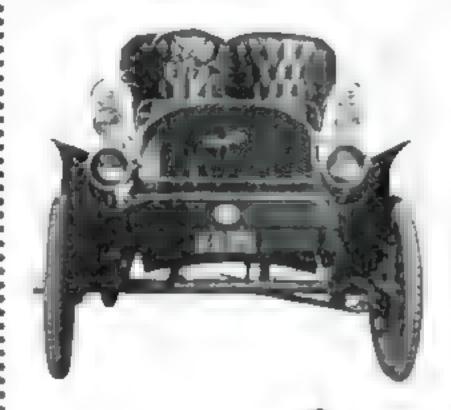
Hundreds of Franklins Still Running

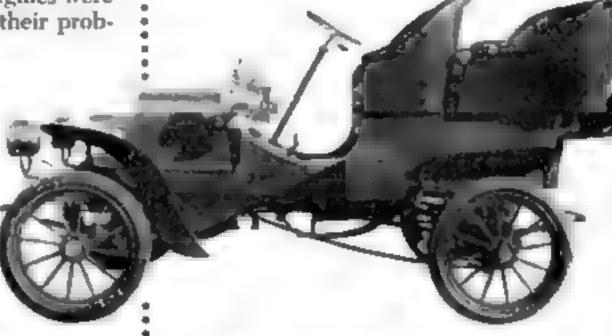
There are, Amick reminds you, a number of air-cooled cars being built in Europe today. And his Franklin club members, who number about 160, know of 500 Franklins still running in the U.S. Amick feels that this "is only a drop in the bucket." One club member has 16.

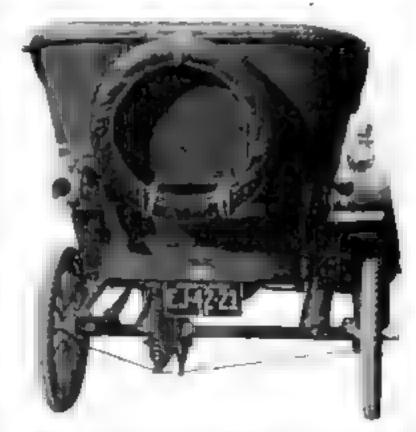
"Quite a few," says Amick, "use their cars every day, but not the real old ones." One man, who has owned nothing but Franklins, drives to work every day

[Continued on page 204]

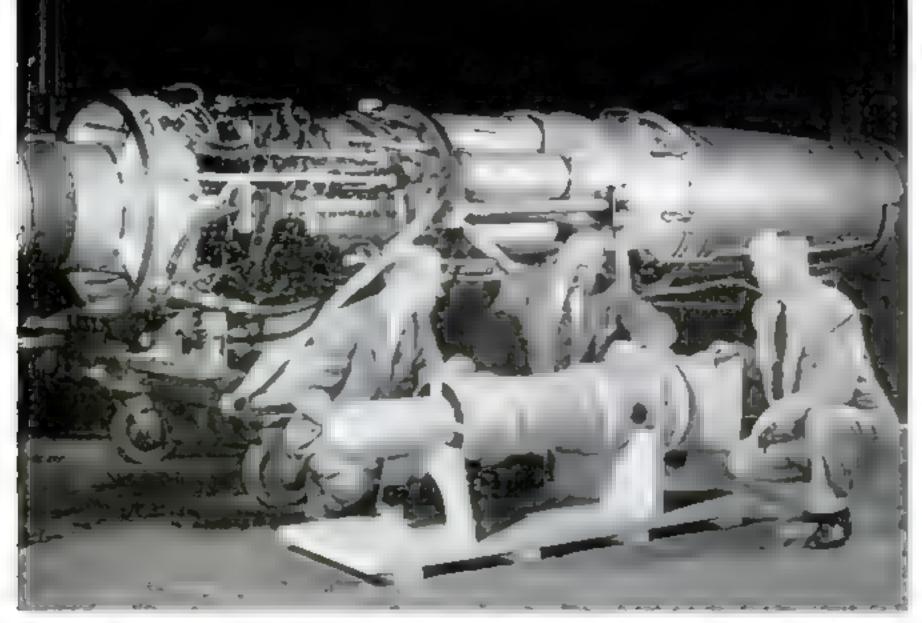
Here's how you recognize an '05 Franklin







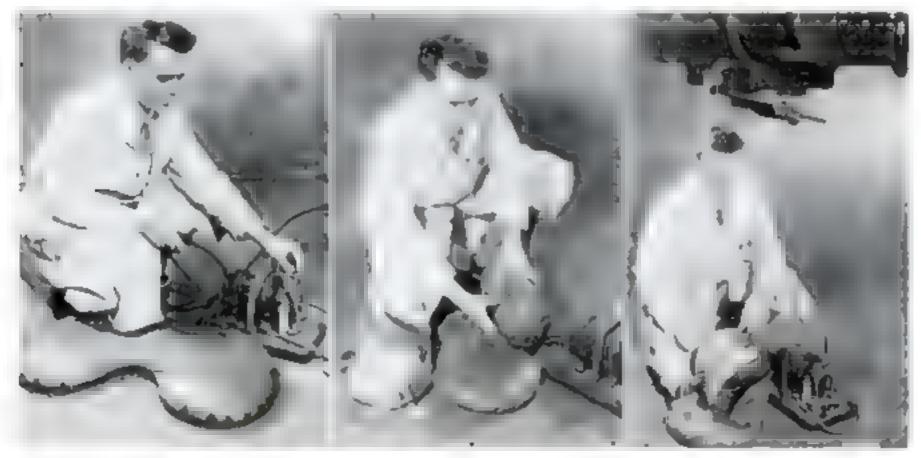
FRONT VIEW shows 1905 license plate (actually not a license but an individual number like a house number), brass grille and head lamps. Side view shows high back seat. Rear view shows chain drive, narrow tires (28 by 3), strapped-on spare.



Baby Turbine with Big Muscles to Power Navy Helicopters

A BABY gas turbine for helicopters, now being developed for the Navy, will look like the mock-up in the foreground above. The XT-58 is about the size of the engine in your car, but is six to eight times as power-

ful. It can be modified to fly fixed-wing planes or boost reciprocating engines. The monster behind it in the photo is the J-47 jet, another GE power package now being used in Air Force interceptors.



Vacuum in a Bag Makes Plane Parts Hold Still for X-Ray Photos

THIN rubber bags filled with granulated plastic, used in hospitals to immobilize patients, have now taken on a factory job. They serve as jigs to speed X-ray inspection of irregularly-shaped jet-engine parts. Partly emptied of air, the kidney-shaped bag (left

above) is wrapped like putty around a part (center). When enough air is exhausted to produce a near vacuum, bag becomes rigid and holds the molded shape indefinitely. At right above a part is ready for X-raying at Solar Aircraft's Des Moines plant.



Everything but a Kitchen Sink Went into This Three-Wheeler

WHEN Bob Dupuis of Lebanon, N. H., rides to school in his Junkmobile, admiring fans surround him. Five old bicycle frames,

three bike wheels, a washing-machine motor and a kitchen chair went into the jalopyplus Yankee know-how and a lot of sweat.



Only His Face Gets Wet

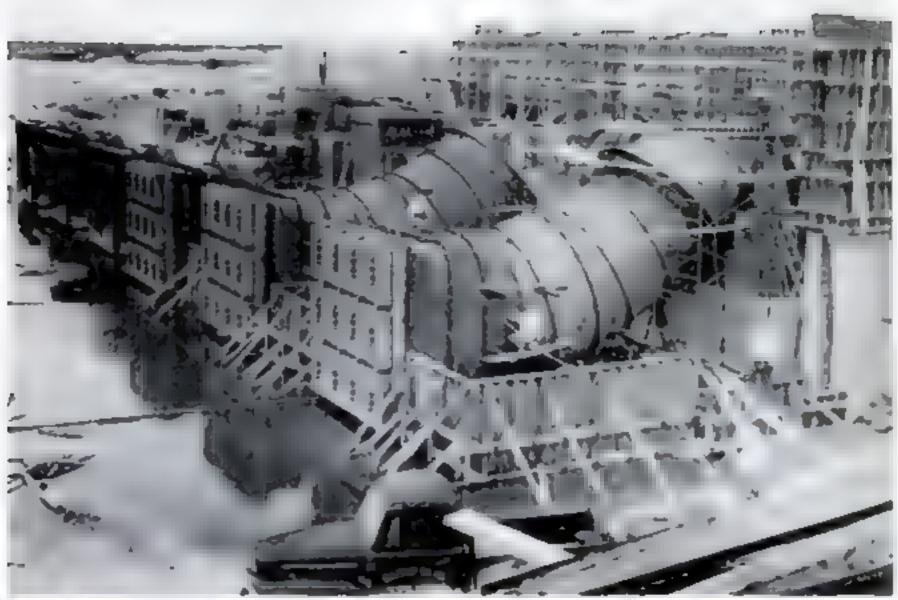
Let it rain—the commuter wearing this wet-weather gear stays dry. The outfit—raincoat, leggings to cover trouser legs, and hat shield is made by U. S. Rubber, NYC.



Fire Gun Kills Flame with Spray

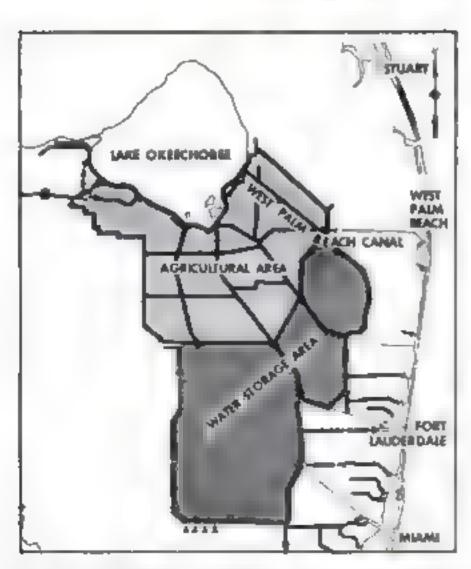
You shoot out fires with the British extinguisher above. It is triggered like a pistol and discharges a fine mist. By blanketing and beating at the flunes, the gun is said to put out a 20 foot ',' end of fire within a second.





Huge pumps, key to Florida's water-control scheme, have 12-foot-diameter discharge pipes.

Giant Pumps to Harness Floods



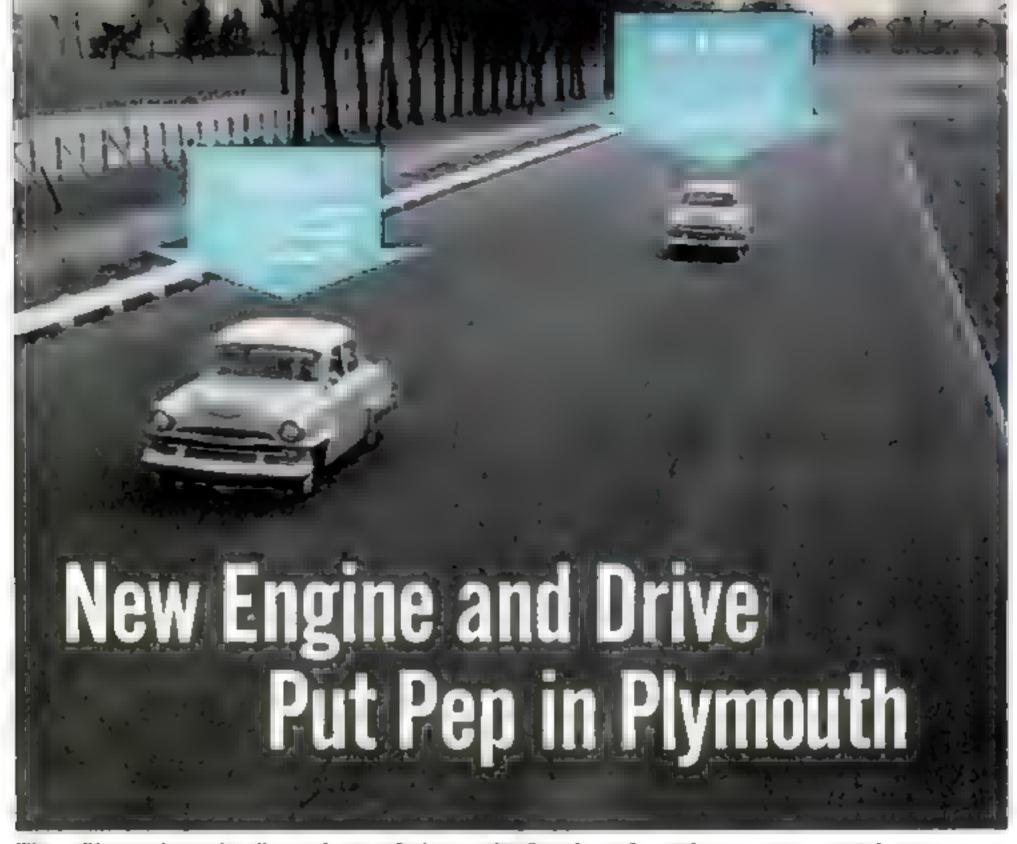
FLOOD-CONTROL PROJECT will cover lands shown in light- and dark-shaded areas. Wild-life, such as game fish and waterfowl, will be protected in the huge water-storage basin.

AVAST, rich area of farm and ranch land in Florida's Everglades no longer will be at the mercy of periodic floods or prolonged dry spells when a water-control program, one of the biggest ever undertaken in this country, is completed.

Key installations in the \$200,000,000 system will be batteries of giant, diesel-operated pumps. One such unit, shown under construction in the photo above, has a capacity of more than 2,000,000 gallons a minute. It is located on the West Palm Beach Canal, which runs 40 miles from mighty Lake Okeechobee to the Atlantic Ocean.

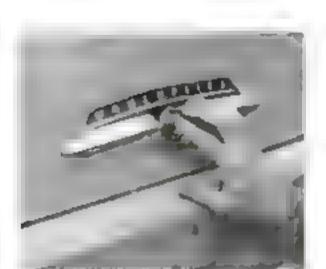
During rainy weather, excess water is discharged into a huge water-storage area now being enclosed by dikes. In dry spells, floodgates at the pump station will permit water to flow back into the farm lands, via the canal, for irrigation.

Farmers and ranchers control their own water level by means of two-way pumps. When they want to get water off their lands, they pump it into the canal; when water is needed, they pump it out.



These Plymouths took off together on Indianapolis Speedway from the curve at top right.

The lightest automatic drive on the market, PowerFlite is hotter than a pistol and as neatly engineered as a T square.



NEW NAME on the trunk lid is the only tipoff that the Plymouth you see parked on the street has a brand-new engine and transmission.

By Wilbur Shaw

PLOP in the middle of the 1954 automobile year, Plymouth has introduced a car that, mechanically, is almost completely new.

I wondered why. If Plymouth didn't have the most powerful engine in its field, it certainly had one of the most rugged. If a man wanted an automatic transmission, he had one of the simplest in Plymouth's Hy-Drive. And only a hot-rodder looking for an argument could really quarrel with the car's performance.

So I took the new Plymouth out on the Indianapolis Motor Speedway to find out why it had undergone major surgery. I also arranged to have there, for comparison, the '54 car brought out last October.

The new Plymouth has a new transmission. Key to the car's performance, it's the same transmission that serves the rest of the Chrysler Corporation's linethe Chrysler, DeSoto and Dodge. It's called Power-Flite (PSM, Sept. '53, p. 116).

Plymouth, born a quarter of a century ago, never had anything but a manual gearbox and clutch until 1953 While everybody else in Detroit was introducing automatic drives with exotic names. Plymouth coasted along with synchromesh. When finally it did change transmissions, it acquired only a semiautomatic.

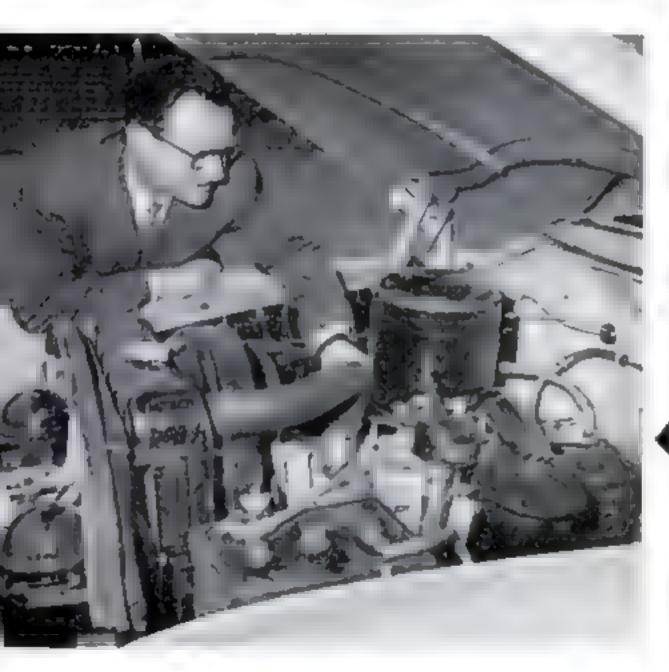
Now Plymouth has a fully automatic drive, and to borrow a phrase from the behoppers, it's real crazy.

PowerFlite differs from the Hy-Drive transmission introduced in midseason last year in that it abandons the clutch pedal and substitutes a planetary gear system for synchromesh.

Less Horsepower and Torque, But-

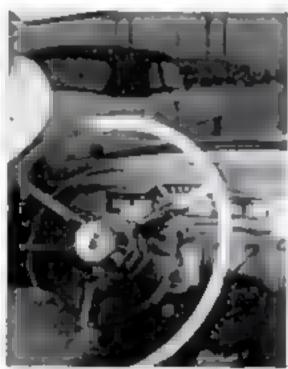
The new engine, up 10 horsepower to 110, is identical in bore and stroke with the Dodge Six. It's considerably shy of the power offered by competitors in Plymouth's field—the Ford has 130, the Chevrolet 125. The Plymouth's torque, the thing that really gives you the push at the rear wheels in taking off or passing, is also less than that of the Ford or Chevrolet.

But just you wait, bub, before you rush to any conclusions. The torque that comes off the end of the crankshaft is one thing. The torque that puts sass in the rear wheels is something else again. In between the two, in automatic transmissions of the torque-





ctutch pedal has disappeared in lightweight PowerFlite—only 43 pounds heavier than synchroniesh transmission, and lightest automatic drive on the market. Torque ratio at stall is 2.6:1; torque multiplication in low gear is 1.72:1. Power steering and power brakes are available.



selector QUADRANT, unlike that on most cars with automatic drives, has no "park" position. That's because of Plymouth's fine emergency brake. In most cars, the emergency consists of cables attached to shoes on rear wheels. Plymouth's has a drum, and shoes on the drive shaft.

MEW ENGINE is a hardy L-head with a lot more snap than OHV partisans would care to admit. As usual with automatics, it can't be started unless selector lever is in neutral. Oil pressure comes from pumps in the control system, unlike Hy-Drive, which gets oil pressure from the engine system.

converter type, are two qualifying factors—the converter itself and the mechanical gears that assist it.

The converter multiplies the torque, just as a car jack multiplies your muscular effort so that you can lift a ton with one arm. The point of maximum multiplication is called the "stall ratio." That occurs just at the split second when the car starts moving. The assisting gears also multiply the torque, of course, as does the rear-axle ratio.

Ignoring the axle ratio (which doesn't vary too much among brands of cars), the engineers have coined a term for what causes a motorist to exclaim, "Brother!" when the light turns green They laconically attribute the sensation to good "breakaway torque." This is the way they calculate it: Engine torque > torque-converter stall ratio × transmission ratio in starting gear

And this is what I found out about the new Plymouth: the breakaway torque is 849.6 pound-feet, highest in its field. The

Chevrolet's is 760, the Ford's 665.5. Part of the Plymouth's showing is due to the efficiency of its torque converter, highest in the industry. Part is due to the gearing combinations chosen by the Plymouth people.

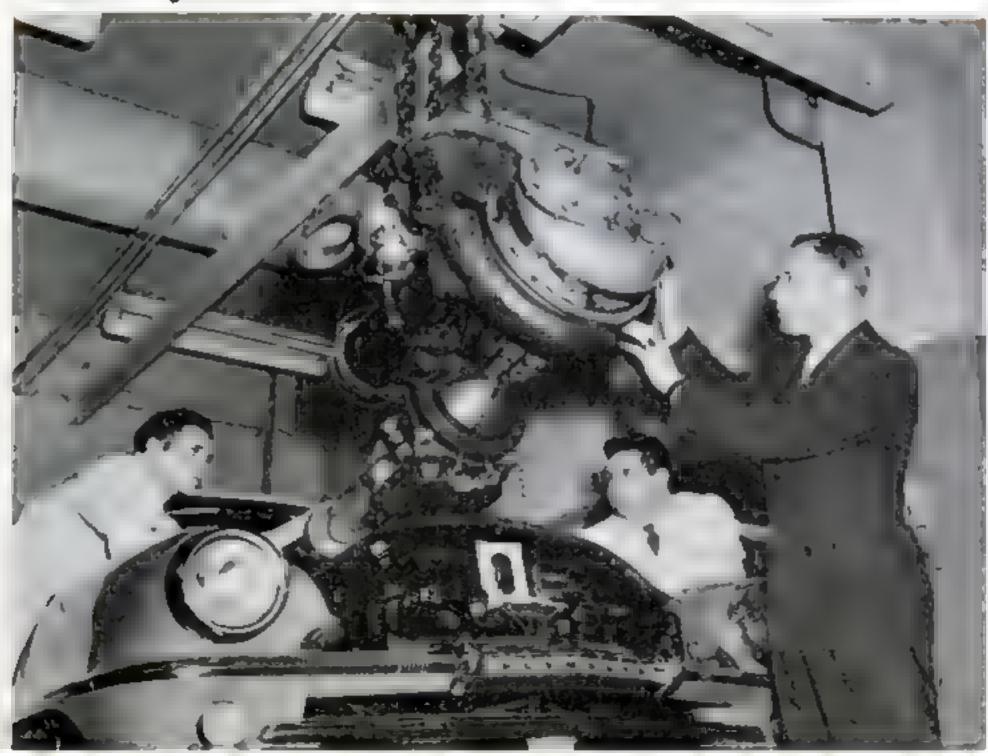
Stop-watched on the Speedway, the new car went from zero to 60 m.p.h. in 18.5 seconds. The car with Hy-Drive required 23.2 seconds.

Accelerating from a steady 40 m.p.h. to 60, to simulate passing on the high-way, required only 10 seconds in the new car, and that was without kicking down the transmission into starting gear. The Hy-Drive job was somewhat slower.

Transmission Up-Shifts at 50

Each ear had two people aboard and about a third of a tank of gas. For zero to 60 in the new car, I kept the accelerator hard down, and the transmission upshifted from starting gear at an indicated 50 miles an hour. Hy-Drive provides no up-shift, Speedometer error for both cars

Turbo-Plymouth Threatens the Future of Standard



FACTS ON POWERFLITE PLYMOUTH

Model: Belvedere 4-door sedan.

Engine: 6-cyl. L-head; 110 hp. at 3,600 r.p.m.; compression ratio, 7.25 l, piston displacement, 230 cu. in., piston travel (in feet per car mile at 20 m.p.h.), 2,185; bore and stroke, 3\%" by 4\%"; crankshaft bearing surface, 37.4 sq. in.; torque, 190 lb.-ft. at 1,600 r.p.m.

Weight: 3,243 lb., per hp., 29 5 lb.

Transmission: torque converter with planetary train; rear-axle ratio, 3.73.1

Steering ratio: 19.6.1 (with power) 21-1 (manual); radius of turning circle, 19%

Effective brake-lining area: 158 sq. in.

Springs: front, coil; rear, semi-elliptic.

Outside dimensions: height (loaded), 61%"; over-all length with bumpers and guards, 193%"; width, 74%"; wheelbase, 114"; overhang, front 32", rear 47%"; tread, front 55%", rear 58%".

Inside dimensions: scat-cushion width, front 59%", rear 58%", leg room, front 43%", rear 43%", headroom, front 36%", rear 35%"; seat height, front 14%", rear 15", vertical distance, steering wheel to seat cushion with seat in mid-position, 5%"; front-seat adjustment, horizontal 5", vertical 5".

Tire size: 6.70 by 15.

was about one mile an hour at 40 and three miles at 60, on the high side.

In contrast to the new transmission, where the gears assist the torque converter, Hy-Drive doesn't get a gear assist unless the motorist actually shifts gears. With a gearbox incorporating a regular Low, Second and High, Hy-Drive will

continue to be offered—at least for now—as a cheaper, alternative transmission.

PowerFlite not only is Detroit's most efficient transmission—I would venture the opinion that it is also just about the smoothest.

Next month Wilbur Shaw writes about the plastic-bodied Kaiser Darrin.

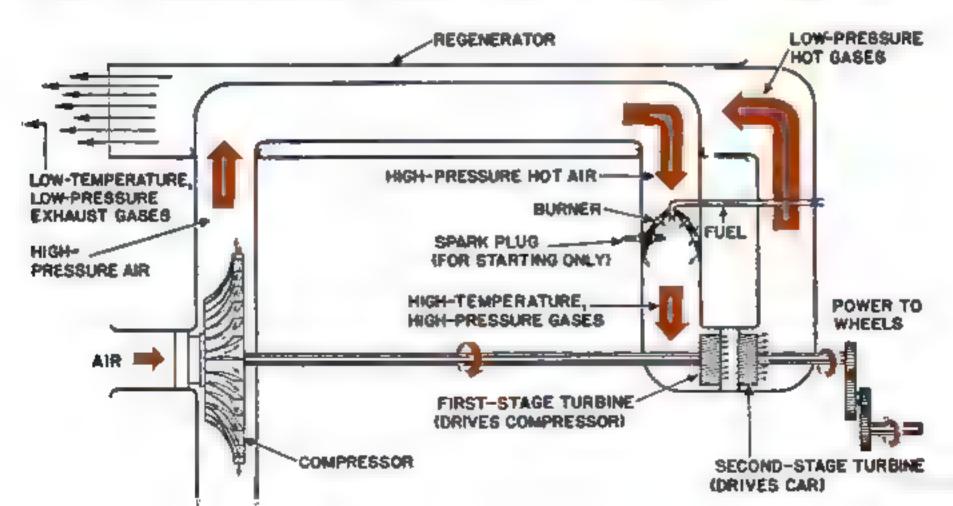
Piston Power Plants

Major obstacles to using gas turbines in passenger cars have been high fuel appetite and high tailpipe temperature. In the new Chrysler gas turbine, an experimental job installed in a 1954 Plymouth (left), both problems have apparently been controlled by a "regenerator." This is a device that extracts heat from

exhaust gases and uses it to boost combustion efficiency (see sketch below).

Compared to the piston engine it replaces, the experimental power plant is smaller, 200 pounds lighter, and has only a fifth as many moving parts.

Rated at 120 shaft horsepower, the turbine "digs out" its test Plymouth at accelerations equivalent to those delivered by a 160-hp, piston engine.



Two-Story Bridge to Crack a Bottleneck



THE San Francisco Bay region is outgrowing its britches, so the California Department of Public Works has decided to put a steel gusset in them.

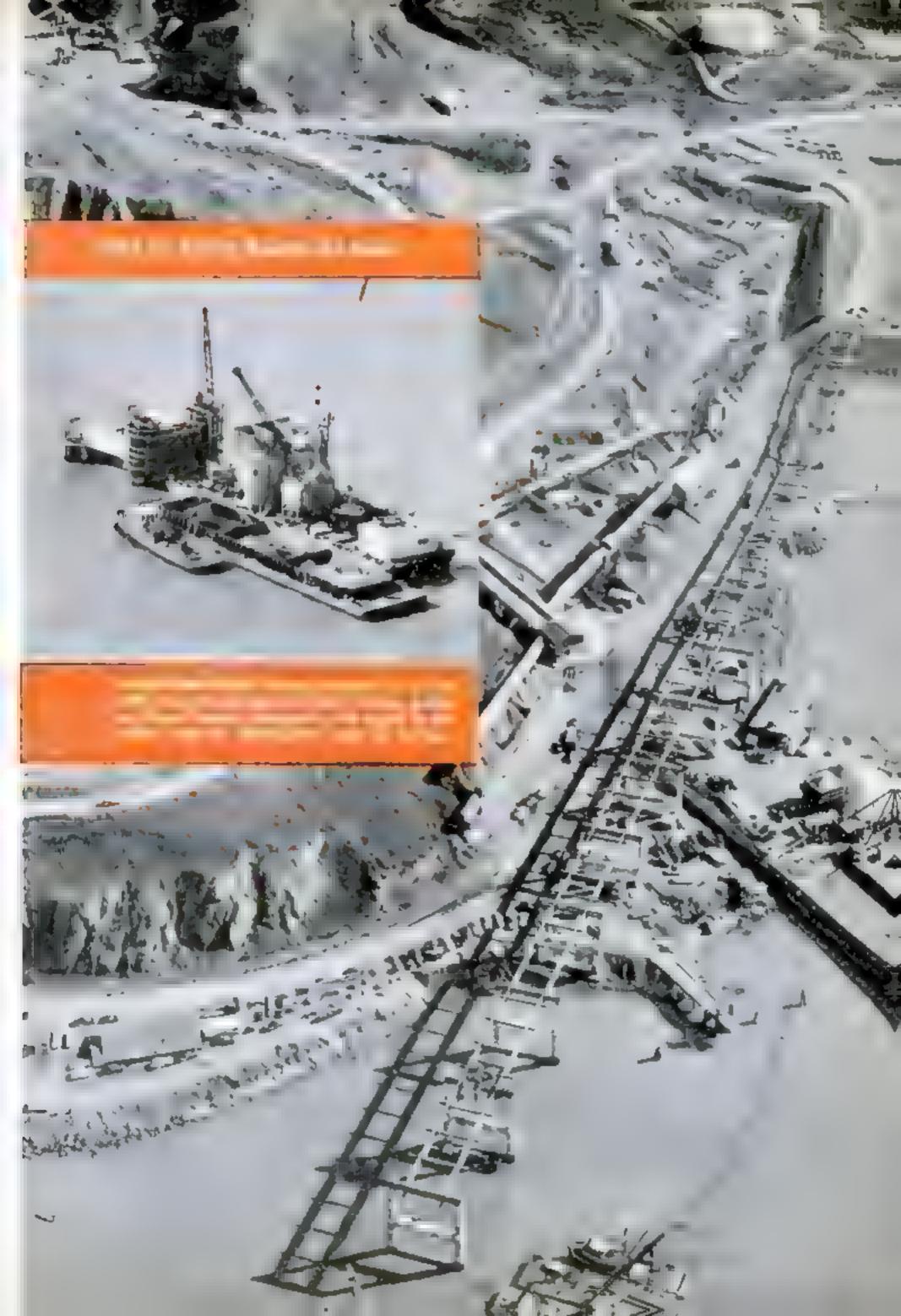
This gusset is in the form of a \$62,-000,000, twin-deck cantilever bridge, more than five miles long, that will connect the rapidly growing Bay Area cities of Richmond and San Rafael.

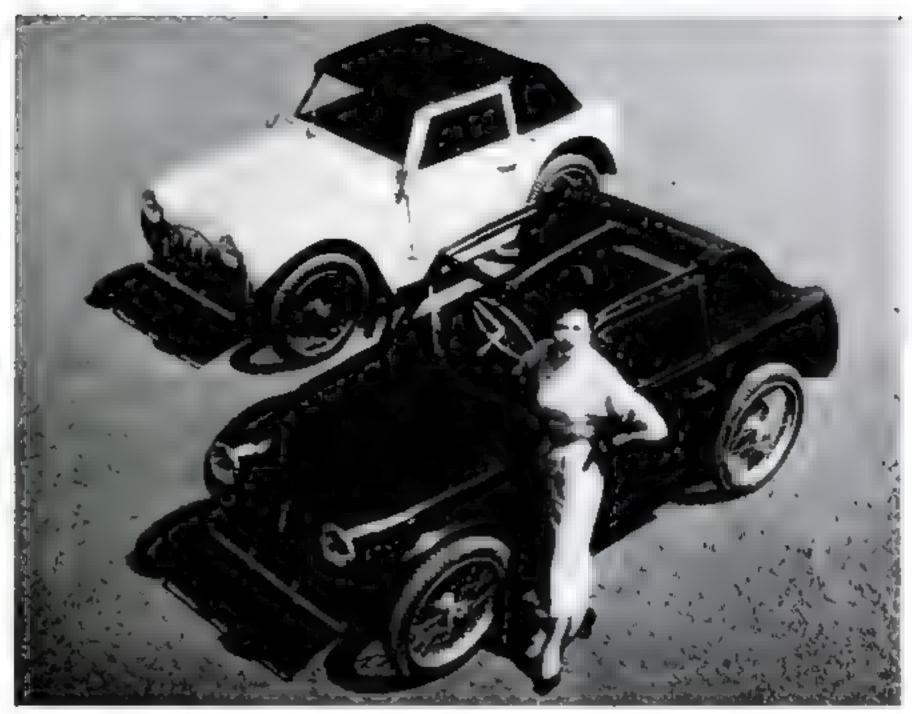
Four miles of the new span will be over water. At its highest point, it will be 185 feet above the water. The entire span and its approaches will not have a grade exceeding three percent—a boon to truck traffic.

In the middle, arching over the main and secondary navigation channels of San Francisco Bay, will be two cantilever spans, each 1,070 feet long. The bridge will have two decks, one above the other. Each deck will have three 12-foot concrete roadways. Traffic will move in only one direction on each deck.

Ferries have plied the route of the projected bridge since 1915. In late years the ferries have carried a peak load of 1,000,000 vehicles annually. It is estimated that the new bridge will carry about 4,000,000 vehicles during its first year, 1957. Ten years after that, it is believed there will be an annual flow of some 6,000,000 trucks and cars across the span.

Although special facilities are being built into the bridge to simplify maintenance, it is estimated that operation and upkeep will cost \$500,000 a year.





Japan's "Flying Feather" Drifts into Baby Convertible Field

This midget two-cylinder, rear-engined Japanese convertible, called Flying Feather, has a top speed of only 37 miles an hour but it travels about 58 miles on a gallon of

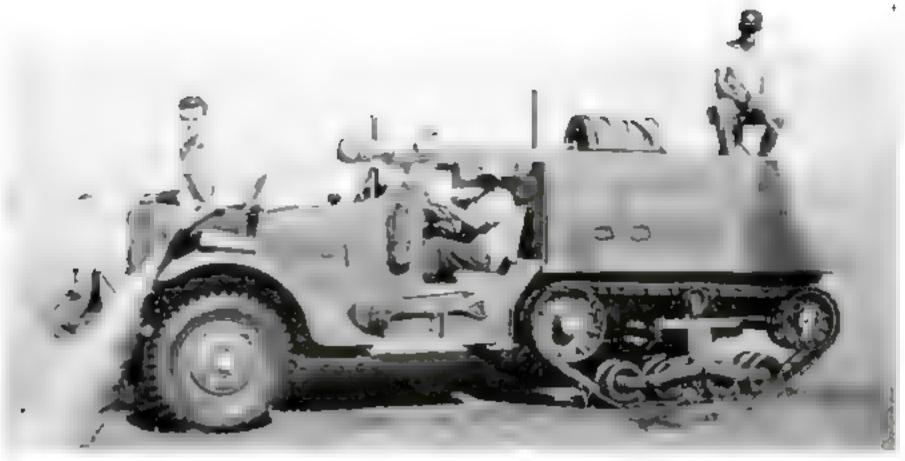
gasoline. It weighs 880 pounds and costs \$1,000, far less than other popular-priced Japanese automobiles. The new car is 109 inches long and 51 mches wide.

Scientists Go Overboard, Meet Fish on Own Level

EQUIPPED with diving lungs, glass-front helmets and foot fins, California marine biologists are dropping in on surf fish, abalone, rockfish and, unintentionally, an occasional shark these days in a state-backed effort to learn more about the local seafood.

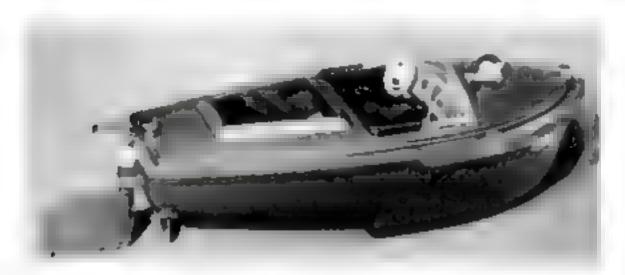
The diving scientists, shown at their watery work in the photos at right, have probed as deep as 100 feet and stayed below for a half hour at a time. One of them (far right) recently brought back a nine-pound lobster that he had hauled out of a sunken reef.





Homemade Half-Track Fire Truck Easily Takes Hills in Stride

To FIGHT grain, grass and brush fires on his hilly ranch near Willows, Calif., Lester Lederer converted an Army half-track into a fire truck that can go anywhere. It carries a 500-gallon water supply and three hoses, along with a 30-horsepower pump.



Toy Boat Cruises by Remote Control

Young skippers can pilot the Schuco toy electric boat at left over a 30-foot course. Two flashlight batteries power the craft through a control box with buttons for forward and reverse motion.







This gracions 150-unit motel at Baton Rouge is adding 50 units and a 500-place restaurant. Swimming pools are common at motels out West, where they have special social significance.



Horizontal Hotels

Once crude cabins, motels now often resemble mansions, and far outnumber vertical hotels.

By Kenneth Wylie

MORE than 50,000 motels await you now, if you take your vacation by car. In the 1930s, curbside calms generally offered you sagging beds and cast-off quilts, tissue-thin walls, uncertain plumbing and the choking warmth of wood stoves. Today's descendants of those dreary havens are often as fancy as any big city's tallest, plushiest hotel

And they are still going up at a dizzying rate in all parts of the U.S., Canada
and Mexico, More than 3,000 new ones
were built in this country alone last year,
at a cost of \$420,000,000. That's more
than six times as much money as was
spent to build the spectacular world
headquarters of the United Nations in
New York.

Latest Facility: A Lunding Field

There are now twice as many motels as hotels in the U.S., and no wonder. Americans spent \$20,000,000,000 on their vacations last year, the AAA reports—twice as much money as General Motors, the world's biggest industrial corporation, took in—and a huge hunk of that sum was distributed along the highways. The vacationists took 86 percent of all their trips by car. They paid more than \$1,500,000,000 for motel facilities, which ranged from a helicopter landing field (the Western Hills, Fort Worth, Tex.) to free ice cubes (almost everywhere). By the year's end, the nation's motels had



A \$100,000 EXTRA at a \$2,000,000 motelhotel in Texas is a 190-by-150-foot landing field for helicopters, presumably not rare vehicles for falighous Jexas hasinessmen



SPEEDY ROOM SERVICE at this Brownsville, Lex., matel, laid out like a swank development of ranch homes, is provided by a threewheel delivery eart, poslided to your door.

on a florida BEACH lies the 115-acre motel village below, which features 650 housekeeping units, nearly any sports facility you can think of, and a good-sized shopping center.



JULY 1954 113



FEW HOTELS could outdo the luxury, comfort and style evident everywhere in the plush lounge of this big, new Miami Beach motel, member of a topflight U.S. motel chain.



SUITABLE FOR PALM BEACH, where it stands, the motel whose curving dining room is seen above has separate pools for adults and kids, tennis courts, a bar, and small care for hire.



A FIREPLACE IN EVERY ROOM is an alluring feature of this motel in Manitou Springs, Colo., at the foot of Pike's Peak, visible beyond the flag. Some units have living rooms.

totted up 45,000,000 registrations—a number equal to nearly one-third of the entire population.

To attract this cash-laden horde of automobile travelers, the horizontal hotels beside the road have been growing steadily bigger and more elaborate.

Suppose, for example, that you were to pull up at nightfall before the entrance to the \$2,000,000 Terrace Motor Hotel in Austin, Tex. You and your brood would be escorted—not by the owner, as in the old days, but by a bellhop—to one of 211 bedroom-bath units, cascading down a high, wooded hill. Your home for the night would provide air-conditioned comfort, ice water, excellent beds, attractive furniture and decorations, ample space for huggage and clothes, a roomy bathroom with plenty of mansize towels and lots of hot water, and quiet.

The kids could work out the day's kinks in and around the motel's swimming pool. Once the bags were unpacked, you and your wife could lounge on the shadowed lawns. If any pressing or cleaning needed doing, the valet or laundry would take care of it.

A call to room service would summon the mixings for a refresher before dinner, and once that was downed you and the family could stroll to the cheery coffee shop for a tasty evening meal.

Even Breakfast in Bed

Want more? Well, if you'll leaf through the AAA Motel Guide (about 6,000 listings) or Duncan Hines' list of the motels he approves of (around 3,000 listings), you'll probably find some motels that serve their guests a free breakfast in bed, between six and eight a.m.

The proprietor of a Georgia motel, hunting for a specialty that might lure more travelers to his door than the next, figured out that it would cost him only eight cents a day per head to give his guests their first meal of the day on the house. Eight cents covered the cost of two doughnuts, a glass of orange juice and a big cup of coffee, with cream and sugar. A child's breakfast would cost

This Grand Rapids Motel Was Built for Half the Average Cost

By using flat roofs, slab floors, prefabricated steel casement windows and a new kind of brick that forms a wall in one course, Louis Cordogan, Chicago architect, built the new, 20-unit Jim Williams Motel at Grand Rapids, Mich., for only \$3,400 a unit. The U.S. average cost per motel unit is \$6.825.

The choice of flat roofs with center drains eliminated the need for gutters, downspouts and the double construction that a pitched

roof demands.

SCR bricks (named for the Structural Clay Products Research Institute), used for the outside walls, come in six-by-12-inch blocks. They are jamb-slotted at one end to receive metal window frames. Walls of these bricks cost about the same as frame construction.

The contractor had to excavate only six inches of Grand Rapids soil to reach sand. On this natural full he spread a 68-pound composition vapor barrier, then poured four-inch slabs of concrete. The architect beat the cold-floor problem by running a perimeter of rock wool around the inner foundation walls.



Each building, placed diagonally on the lot, consists of four units clustered around a utility-room core. Every unit is roughly 15 feet by 10% feet

The Jim Williams Motel typifies two growing trends in the industry. It features separate buildings in place of a string of attached rooms, and its manager and his wife trained for their jobs by taking a three-month correspondence course in motel management, including 20 lessons in college-

level accounting.

him 10 cents, for he would have to substitute milk or hot chocolate for coffee. Even so, he estimated that he could serve a free breakfast to every person in his 30 units every day of the year for less than one percent of his annual operating cost.

If your holiday journeyings take you through the Southwest, you will find that many a motel rivals a dude ranch both in looks and in facilities.

Along the seacoasts, it is not unusual to come upon a motel like the El Rancho, a 50-unit layout at Myrtle Beach, S. C., which sprawls within a few steps of the Atlantic. In addition to surf bathing, it offers bunting, fishing and golfing.

If you are driving through the Midwest, you will discover many motels like Eaton's, in Hamilton, Ohio—boasting swimming pools, Eaton's pool is typical. It is heated, measures 20 by 40 feet, has underwater lighting and is surrounded by a patio.

However, at a minimum cost of from \$3,000 to \$5,000, it will be some time before motel swimming pools are as common as their sterilized glasses.

Motelmen like to say, and can hardly refrain from rubbing their hands when they say it, that every road leads sooner or later to a motel. This is especially true of California, where there are 7,330 motels, and Florida, which has 4,124. These favorite vacation states lead all the others in motel population, though it is surprising how concentrated they sometimes are elsewhere. For instance, there is an 11-mile stretch just south of Hartford, Conn., that contains 31 motels.

Why Travelers Like Motels

Your reasons for preferring a motel to a hotel have been pretty well established—at least in the minds of the folks in the motel industry.

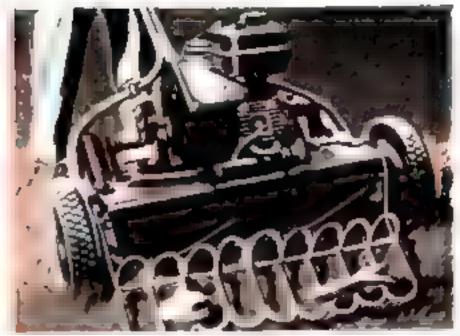
At the end of an eight- or 10-hour drive in vacation-time traffic, you haven't the heart to push on through city congestion to a hotel. You want to stop right beside the road and step straight from your car into a cool room with innersprings, ice water and silence. You want to let the children loose to romp in the open space that surrounds most motels.

[Continued on page 208]

I'd like to see them make...



A COLLAPSIBLE SHILTER that would clamp to the fender of a car when you have to change a flat tire in had weather or in the hot run.—J. D. Ducharma, Holyoka, Mass.



LAWN MOWERS with a rake attachment at the front to push twigs and stones out of the path of the cutting blades.—Mrs. Karl S. Descey, Malone, N. Y.



A LIGHTWEIGHT LADDER made from sheet aluminum with treads welded in place on steps formed by slitting and punching in the metal.

—B. M. Franklin, Hunter, Okla.



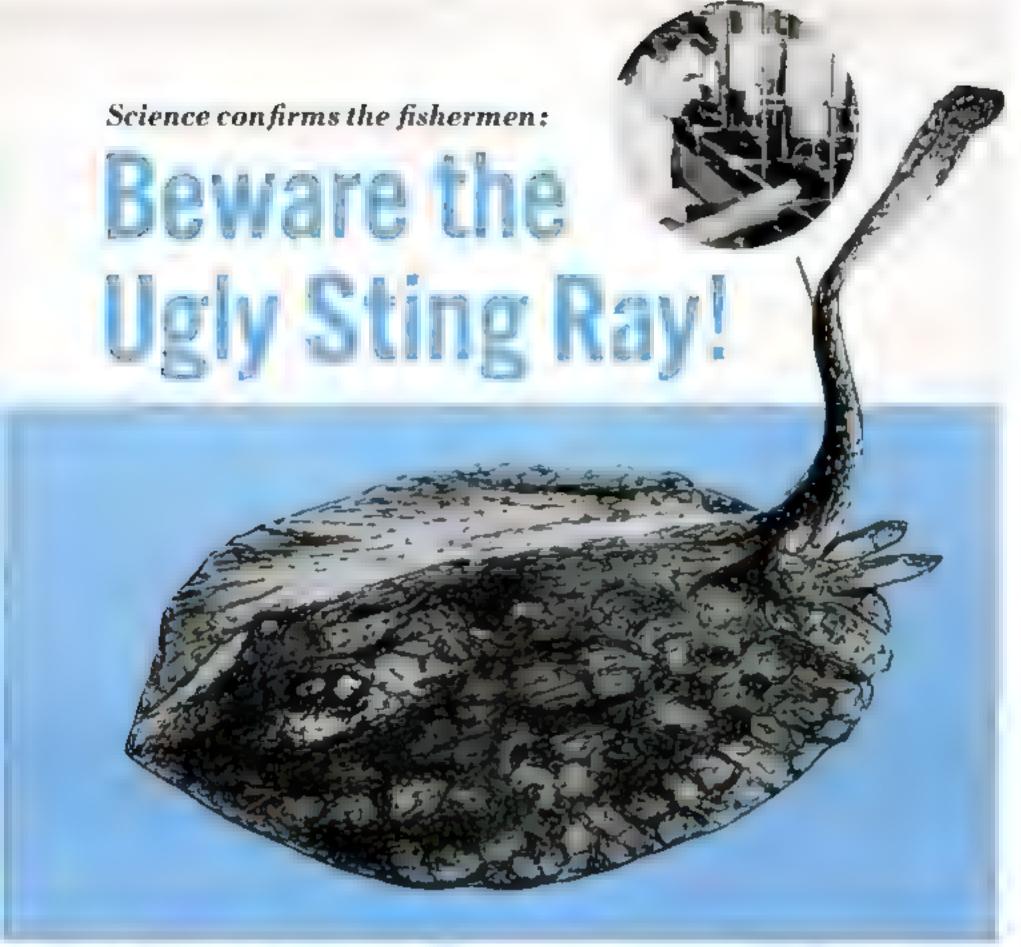
WINDOW SHADES with aluminum foil on the outer side. They would deflect the sun's rays and act as insulation to keep the house cooler in summer.—Gerald L. Hegel, Cincinnati.



A HAMMER with a hinged handle that could be adjusted and locked in position for driving or pulling nails in corners and tight places.—John P. Krzemien, Gowanda, N. Y.

Everyone has his own pet idea of a gardeet that he would like to see in general use. The Eve ideas dissirated above were suggested by Popular Science Monthly readers. What

is voter? We will pay \$5 for each one published. Please use government postcards only. Wrate name and adopted ricarly. Contributions cannot be acknowledged or returned.



Sting on a ray's tail points at Dr. Russell (circle) studying sting-ray venom in laboratory.

Researchers report this queer fish will not only knife you but pour poison in the wound.

By Edward Hutchings Jr.

THOUSANDS of years ago fishermen and bathers learned to give a wide berth to the queer fish called the sting ray. This prudent practice is fully endorsed by the latest dope on these ugly critters from a scientific study of them now being made along the California coast.

At first glance, the small round sting ray most often encountered around American shores looks as harmless as it is useless. It is a flat, brownish fish, measuring anywhere up to 20 inches across, with a long whiplike tail. Its favorite activity is to lie motionless, buried under the warm sand or mud, in shallow water.

Obviously, it is no trick at all for a fisherman or bather to step on one of these creatures—and this is when the sting ray shows its ornery side. The pressure of a foot on its back provides the incentive, and the leverage, for the fish to whip its tail around and thrust its sting into the foot or leg of its victum.

This treacherous weapon is carried on the upperside of the sting ray's tail. A hard, bony structure, it has sharp barbs



along both sides of the last half of its length, like a two-edged saw. It is fiend-ishly designed to cause pain when the ray jabs it into a victim, and to lacerate the victim's flesh when the ray draws it out again.

An 11-inch ray usually has a sting about 1% inches long; a 200-pound ray



ON SEACH at Corona Del Mar, Calif., Dr. Russell cautiously flips a small ray from net into bucket. In lab he extracts venom from the sting to study its effect on animals.

will have a 10-inch sting. Large rays can inflict serious, and even fatal injuries. A fisherman who mixed with a 10-foot sting ray off Australia was struck with such power that the sting went through his leg. And a woman was once wounded fatally when a ray drove its sting through her heart.

Even a sting from a small ray can be an unforgettable experience. Take the case of Joe, a 27-year-old employee of the California Fish and Game Department, who was struck by a round sting ray while seining in Alamitos Bay, near Long Beach. Less than two minutes after he was struck the sharp stabbing pain in his foot and ankle was so intense that Joe went into a state of shock. He was quickly revived, and soon began to have muscular spasms in his foot and leg. For half an hour he was dizzy, nauseated and in constant pain. Codeine gave him no relief, so he was given an injection of demerol, and in about 15 minutes he was able to hobble around on his injured leg.

The pain hung on for several hours. It was only occasionally sharp, though, and it was even further relieved when Joe soaked his foot and leg in hot water. By the next day the pain was completely gone. The wound itself took 16 days to heal. Because the pain from a sting ray is usually all out of proportion to the damage that can be caused by the sting itself, doctors long ago decided that it must be aggravated by bacterial infection, from dirt and slime left deep in the wound. Only in recent years has it become clear that most of this pain is probably caused by the sting's venom.

Doctor Becomes Fisherman

This venom has been the subject of a scientific study conducted by a Californian, Dr. Findlay Russell, since 1952. Dr. Russell began by trying to confirm the actual existence of sting-ray venom, went on to study its pharmacological properties, then came to consider its medical aspects.

[Continued on page 224]

THESE ARE AVERAGE-SIZE diamond sting rays collected by University of California researchers. Sting nearly four inches long can be seen halfway up tail of the ray at far right.





Turret Changes Lenses Fast on Still Camera

THE revolving turret, widely used on movie cameras for interchanging lenses quickly, has been adapted for use on a still camera. A miniature Rectaflex shown in Paris (left) swings any one of three lenses into position when you spin a wheel. Although bulky, the turret is said to be light in weight and not difficult to manipulate.

Italy's Turbo Car Hits 175 M.P.H.

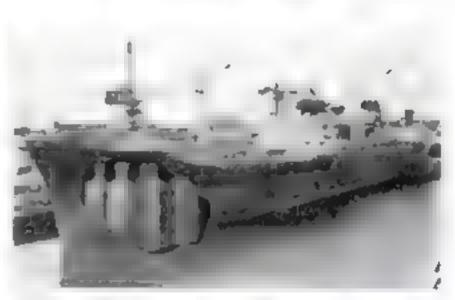
AFTER five years of experimental work, the first turbine-powered. Fiat has hit the track. Swirling gas as hot as 1,470 degrees F. spins the turbine at 22,000 r.p.m. to develop 200 horsepower. Two large rear fins give the ear stability at a top speed of 175 miles an hour.





Kits Make Fancy Foreign Cars

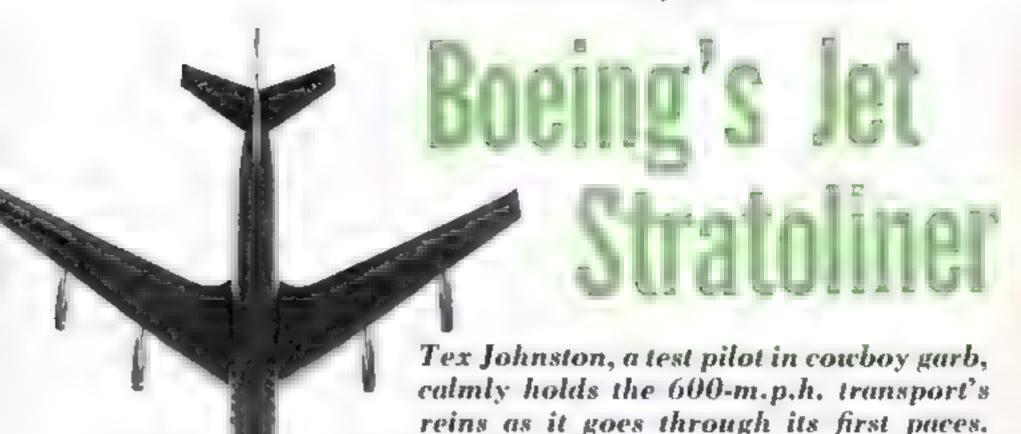
A LOT of big car names have been added to the screwdriver assembly line. The boy above is at work on a Jaguar, while a Pegaso, Rolls Royce and Corvette stand ready to roll. Ideal Toy Corp., 200 Fifth Ave., NYC, makes the kits.



Acids Shipped in Rubber Casks

Six rubber-lined tanks ride the hold of the SS Marine Dow-Chem to haul acids and caustic chemicals. Goodyear field men vulcanized the rubber with steam under pressure while the tanks—each 15 feet across and 41 feet deep—acted as heat containers.

A broncobuster of the skies rides



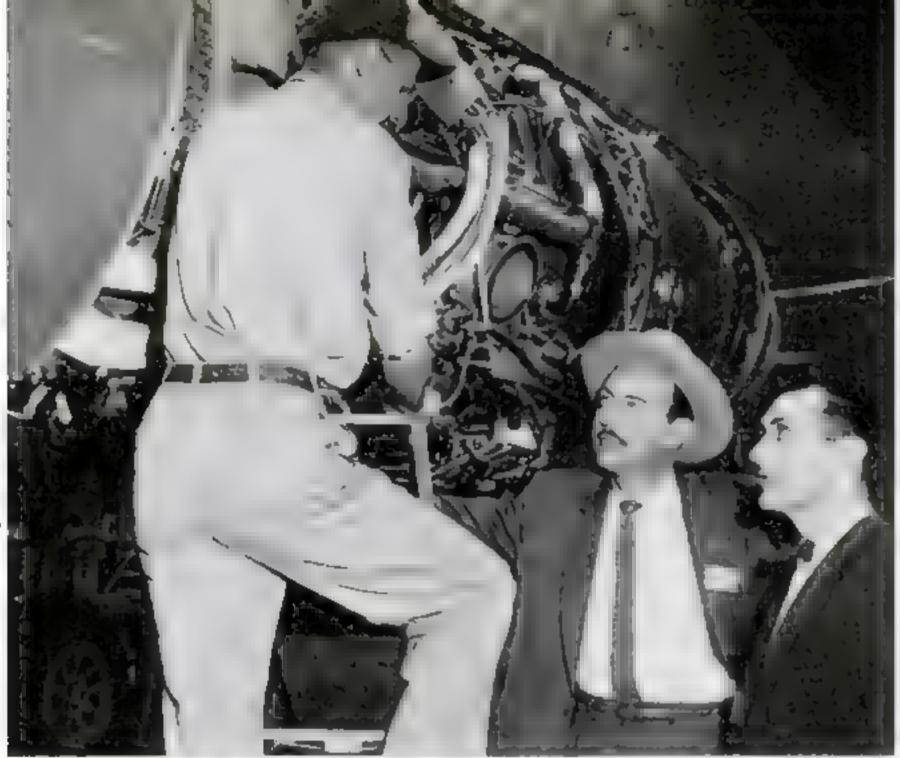
By Andrew R. Boone

TEX JOHNSTON is tall and range and he can spit into a 40-mile wind. He wears a cowboy's high-heeled boots and hig hat, and he can spin you yarns from sumup to supper without repeating himself. And there is something else about Tex-when it comes to flying, he knows just about as much as there is to know.

When I chatted with Tex recently in Seattle, he was getting set to pull back on the control yoke and soar

speed is in every line of the log, new brownand-vellow Stratoliner, seen below as it was first rolled out of its hangar. Model above shows how it looks from overhead.





JET PLANES ARE AN OLD STORY to Tex Johnston (in the hat, natch), who was in the driv-

er's sent when both the B-47 and B-52, USAF jet bombers, made their maiden flights.

aloft in the fastest passenger-type airplane the world has ever seen.

It would be the first flight of the first model of America's first jet aurhner.

Tex Johnston, chief of flight testing for the Boeing people, allowed as how he would get this here flying machine unglued from the runway and mosey on upstairs and see how many knots she could make.

Slide Rules Predict Performance

The fact is, he already had a pretty good idea. He and the engineers had figured it all out ahead of time. Unless the slide rules were plumb loco, this airplane would turn up some 600 miles an hour in high gear and cruise at around 550.

Tex would be testing an airliner that —sooner than you imagine, maybe—will be flying from Los Angeles to New York in less time than it takes a fast train to make it from New York to Boston, It will be able to fly the Atlantic in the time it

takes a motorist to drive from Kansas City to St. Louis,

Eastbound, with the prevailing winds, it will span the continent nonstop in about four hours. Westbound it may re-

How They Compare



	B-47	
Span	116 PL	
Longtle	106 ft., 8 in.	
Height	27 ft., 11 lin.	
Sweephack	35 degrees	
Weight	200,000 th. gress	
Range	Over 3,000 mi.	
Speed	Over 600 m.p.h.	
Service Ceiling	Over 40,000 ft.	
Power	6 GE J-47 turbojets, 5,800 lit. thrust	
Payload	20,000 th, of bemis	

quire an hour more. These speeds will chop three hours and 15 minutes off the present fastest west-to-east transcontinental flights and three hours off the fastest east-to-west flights.

This airliner will fly twice as high as present propeller-driven airliners—up to 40,000 feet, or almost eight miles, of altitude. Jets *have* to fly high. At low altitudes, their speed rapidly diminishes. Jets need rare air to do their best.

Passenger Capacity Will Be Large

There will be a lot of other things about this particular airliner that Tex will be proving out this summer as he gets those spike heels and fancy-sewed toes on the rudder pedals. For one thing, it will carry a lot of people. Tex and his side-kicks don't know exactly yet, but they won't be surprised if it proves capable of toting 125 to 130 passengers. That's 45 to 50 more than the biggest of the current airliners will accommodate.

Then there is the way they plan to slow the Stratolmer down, once it's out of the air and in its landing run. They are going to turn the stream of jet gases from the engines around to blow the other way—and get aerodynamic braking by jet reaction.

Aerodynamic braking has a kmg-size by-product that may, in the end, prove



OIG FEET FOR A DIG BIRD, the eight main wheels of the Stratoliner are mounted on two sets of tandem axles (left set, above). There are also two wheels under the plane's nose.

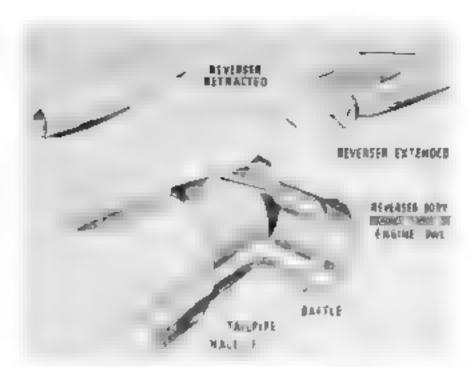
to be one of the main reasons why jet transports are practicable. Here's the story:

Drawback: Slow Thrust Recovery

The gas-turbine engines used in jet aircraft turn up five or six times as many revolutions a minute as piston engines. When they begin losing revolutions, their power to propel an airplane—that is, their thrust—drops off alarmingly. Worse, they don't react instantaneously to opening the throttle, as piston engines do. It takes precious seconds for them to recover their speed and thrust.

If the pilot of a jet airplane "misses an approach"—if he isn't at the right height,

		To Aller	
		3	
B-52	STRATOCRUISER	STRATOLINER	
185 ft.	141 ft., 3 m.	130 ft.	
153 Pt.	110 ft., 4 m.	12# ft	
48 ft.	38 ft., 3 m.	38 ft., 3 m,	
35 degrees	Slight	35 degrees	
Over 300,000 lib. gross	145,800 Eb.	190,000 lb. gross	
Over 3,000 mi.	3,000 mt.	Over 3,000 mi.	
Elver 600 m. p. h.	300-340 m. p. k.	Over 550 m. p. h.	
Over 40,000 ft.	33 000 ft.	Over 40,000 ft.	
8 PAW J-57 turbojets, 10,000 (b. thrust	4 P&W 3,500-hp. R-4360s.* with GE burbosuperchargers	6 P&W JT3-L turboyets (similar to J-57s), in 10,000-lbthrust class	
Restricted information	25,000 lb.	25,000 lb.	



NEW KIND OF BRAKE, a retractable device that reverses the thrust of each jet engine without requiring reduced throttle, has been designed to slow the Stratoliner for landing.

at the right speed, when the near end of the runway flashes by underneath—it's touch-and-go on his thrust as he pours on the coal to go around and try it again.

Yet he has to reduce his thrust to get slowed down to land. That's where the aerodynamic braking comes in. By controlling the direction-of-flow of the gases from the tailpipes of the new airliner, the pilot can slow down or speed up the airplane at will without changing the speed of rotation on the engines. Instantaneous maximum thrust is his for the asking.

Drop-Off Engines

Tex Johnston has other safety devices at his command as he wrings out the new transport according to the syllabus of the test program. One of them sounds plain crazy-the engines are attached to the plane in such a way that, under certain circumstances, they can drop right off. They are swung on fixtures below the huge wing. If an engine gets out of hand, vibration and the wrench of suddenly frozen torque will cause it to slip its moorings. It's installed that way. It can go sailing off into space without rupturing any of the main structure of the airplane. A valve controlled from the cockpit shuts off the fuel supply. It's that simple.

Some other aspects of jet-transport flying are not. Noise is one of them. For all that the airplane and engine manufacturers have been able to do, jets are still a lot noisier than propeller airplanes. They roar—to people aground.

c 01 10 434 + bc

And jets are hot. When airline jets become operational in the U.S., Mother will have to keep Junior away from the tailpipes as the aircraft fire up. At full throttle, the gases issuing therefrom run a temperature of \$50 degrees F, at a velocity of 475 miles an hour—a full 25 feet away.

Passengers Can't Get Shakes

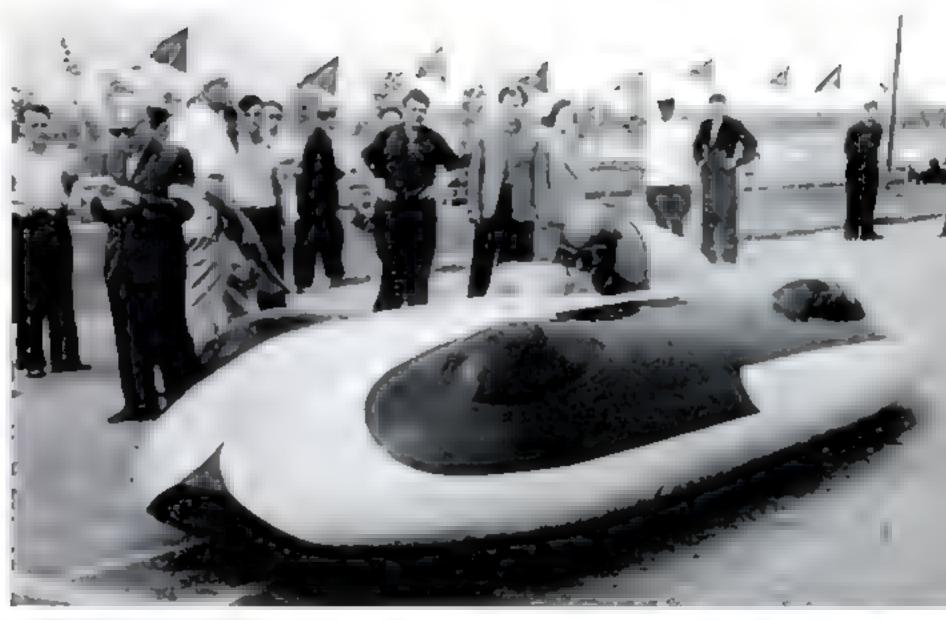
As anyone knows who has read accounts of flying in the British Comets—grounded recently for a review of design and performance in view of some accidents—jet flying is as smooth as silk. Unlike that in propeller aircraft, there is no vibration. Nor, for most of the passengers, is there any noise. There is only the swish of a giant surf, the friction of the wind on the fuselage, Passengers sitting aft do get a faint echo of the bellow of the jets.

Tex Johnston's new jet airplane is not actually a transport. It's decked out experimentally as a tanker plane for a long-range bomber fleet. As such, it's being tested with an eye to selling it to the U.S. Air Force, But the airplane is shaped like a transport, and Boeing is going to put it through its proving trials with a transport in mind, too.

[Continued on page 232]



REPUBLING IN FLIGHT can be done at 500 miles an hour at 40,000 feet, and at far greater distance from home base, when Stratoliner-type planes are used as tankers.



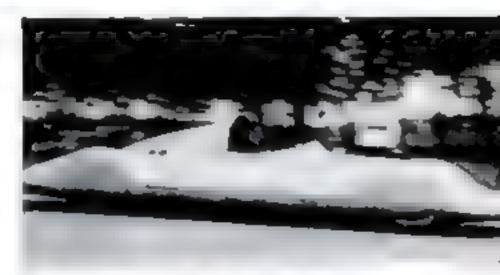
Russian Zvezda Goes Z-z-z-zip

Though the Russians don't claim to have invented the racing car, their midget speedsters are evidently in a class by themselves. The one above, a Zvezda, is said to have broken eight world's speed records unofficially. Another, a Kharkov-250 (right), covered three miles at an average of 132 m.p.h. It was powered by a two-cycle engine of 15-cu.-in. displacement (1/16 as much as a Ford V-8's).



Austrian Car Is Stingy on Gas

THREE's a crowd in this new, three-wheel Viennese convertible, but it is reported to go more than 100 miles on a gallon of gasoline. Its one-cylinder, two-stroke, nine-horse-power engine gives it a top speed of 50 miles an hour. Gearbox has five speeds.





Swiss Scooter Resembles Plane

This new Swiss motor scooter has an airplane-type, side-hinged canopy and a sharp, planelike nose with a single headlight in it. There is room for one passenger behind the driver of the three-wheel, eight-horsepower vehicle. Engine is in the rear.

Superaccurate Saw Runs on Tracks



WALL TRACKS guide the cut of this precision plywood saw. The saw carriage is counterbalanced by weights hidden in the rear track. The outer track frame, hinged at the top, can be clamped against the stock to be cut by applying foot pressure at the bottom. Rollers set into a parrow shelf (at lower left, above) support work.



PLYWOOD 18 ROLLED into place under the saw and clamped with the top track. The saw can be hand-fed or will cut by gravity if a one-pound weight in hung on it. As the work-supporting shelf and saw track are at right angles, the cut is sure to be square.



RIPPING PLYWOOD the long way is easy, too. By loosening a couple of clamps, the portable saw can be turned at right angles to the track. It is clamped at a height that will rip to the desired width, and the work is fed in on the roller shelf by hand.

IF HE had not bought a new house two years ago, Ira E. Price of Cleveland probably wouldn't be an inventor today. The house gave him space for the

The house gave him space for the home workshop he had always wanted. In building the new furniture he had promised his wife. Price found it hard to

get accurate miter cuts on his bench saw. By the time he finished, he was sure he could build a more accurate saw.

What Price calls his complete sawing machine cuts to hairline accuracy—within 1/256 of an inch, he claims. Instead of the five- or six-inch protractor head of



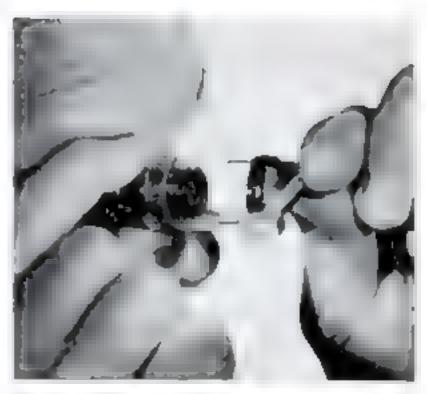
FOR CROSSCUTTING, a portable saw slides along the upper track of this general-purpose machine, Price's first invention. The work, aligned against a fence at the rear, rests on the lower track and is clamped down by the upper one. Both tracks can be set either square to the fence or at any angle up to 45 degrees by a big graduated hoop in front.

the ordinary miter gauge, it has a hoop of almost 24-inch radius on which the degree marks are fully half an inch apart. This makes it easy to set the angle by eye within a fraction of a degree. Any portable electric saw can be used. It runs on tracks, The work is clamped under it.

Not stopping there, Price adapted the same idea to the awkward task of cutting large sheets of plywood. He mounted vertical tracks on the wall, counterbalanced the saw, and built a roller track for the plywood. He has applied for patents on both saws.



FOR RIPPING, the upper track is awang back and the saw mounted at right angles to the lower track. A spring holdback and a splitter help hold work against the fence. Stock up to 11% by 2% inches can be ripped.

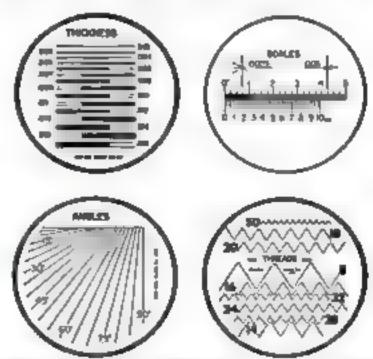


Eye Mikes Thousandths

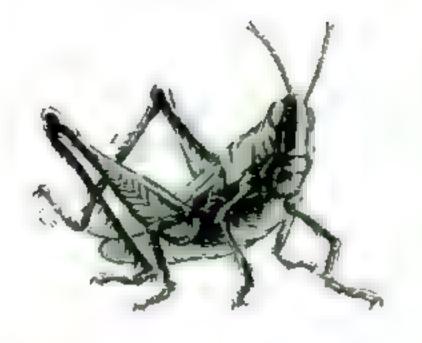
Mount a lens before a transparent scale or gauge and you can measure small objects visually. This pocket-size comparator has a six-power lens, quick-acting adjustment, vernier focus, and interchangeable reticles against which work is gauged.

The instrument is clear acrylic plastic and anodized aluminum. Made by the National Tool Co., 11200 Madison Ave., Cleveland, Ohio, it comes with a reticle having scales in inches and millimeters at \$9.75. Six extra reticles at \$4.25 make it possible to gauge angles, threads per inch, thicknesses, small diameters, and radiuses.

Without reticles, the lens can be used to inspect cutting edges or surface finish, check defects in castings, metal type, or engravings, locate holes accurately and do fine model or instrument work.



SCALES REVICLE furnished with comparator (upper right) measures to .5" in steps of .0025", to 10 mm. in steps of .2 mm. Others gauge thickness, angles, threads.



Taming old Ezra's tractor in time to save his hay from the hoppers has Gus hopping, too.

By Martin Bunn

BUSINESS was rather quiet around Gus Wilson's Model Garage when that hot east wind started blowing. The rush of the harvest season was still more than a mouth away. But with that wind came the grasshoppers—and action aplenty.

The hoppers swept over the countryside. Up to two inches in length, they had been appearing periodically in the area, but the oldest residents declared that they had never before seen such hordes of the pests as now invaded the fields

Farmers sprang into frenzied activity, moving into the fields to cut the green grain and stack it for hay, before the hoppers are it to the ground. Cars skidded into ditches on the highway, radiators boiled from becoming clogged with crushed grasshoppers.

Gus Wilson and his helper, Stan Hicks,



Swiftly, Gus checked the distributor cap for

found themselves busier than apple pickers in a hail storm.

In the midst of the confusion came an urgent telephone call from Ezra Hendricks, who ran a farm a few miles out of town. Ezra was an irascible old character who with his close neighbors, Pete Blinstock and Tom Hanratty, was often a source of amusement to Gus.

Gus Gets a Call for Help

"Get on out here, Gus," Ezra Hendricks yelled over the telephone, "The danged hoppers are eating my place bare to the bone, right before my eyes,"

Gus grinned at Stan Hicks, brushed a



cracks, the primary and secondary wiring for breaks. "Let's try her now, Ezra," he said.

grasshopper from the back of his neck.

"You don't tell me!" he roared. "What do you want me to do, Ezra? Come out and shoo 'em away?"

"No, you lantern-jawed idiot," Ezra howled. "I'm cutting my grain and the tractor won't run."

The grin left Gus's features. This could be serious. Gus had put that queer old tractor—a converted auto—in shape for harvest hardly two months back. A balky tractor at this time, with every rig in the country busy, could cost Ezra tons of valuable hay.

Gus tossed his field kit into his car and took off for the Hendricks farm, When he arrived he found not only Hendricks, but also his two neighbors, Pete Blinstock and Tom Hanratty, huddled around the tractor. A hayrake and a hayrack, both horse-drawn, stood close by.

Friends in Need

Despite their constant wrangling, these three old codgers were the best of friends. Blinstock and Hanratty had rushed to aid Ezra in putting up his threatened hay.

"You old goat," Hanratty was yelling, shoving his round, florid features within inches of Ezra's gray, bristling beard. "I tell you the whole shebang's haywire,

from stem to stern. I could cut more

hay with a dull scythe."

"The gas tank's full of water," Pete Blinstock insisted, "Old Ezra's so tight that he cuts his gasoline half and half with water."

"Bah!" Ezra exploded, his tattered hat crawling with grasshoppers as long as a man's finger, "Here comes Gus Wilson. He'll have this thing perking like a kitten in no time."

"She'd better perk," Gus said grunly,

jerking his kit from the car and preparing to go into action. "How's she act, Ezra?"

"Won't pull the hat off your head," Ezra grumbled. "Jerks along, backfiring to beat the band. Sounds like a Gatling gun."

"Backfiring, eh!" Gus grunted, stuff-

ing tools into the capacious pockets of his coveralls, "Ignition trouble."

NAME OF THE PARTY OF

"Are you ekay?"

The cover for one side of the tractor's hood had been removed to let the engine run cooler in the stifling weather. Swiftly, Gus checked the distributor cap for cracks, the primary and secondary wiring for breaks,

"Let's try her now, Ezra," he said,

stepping back.

Motor Runs-but Gus Isn't Happy

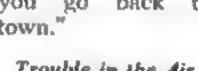
Ezra stepped on the starter. The motor ran smoothly. This might be one of these jobs that haunt garagemen. You have a balky engme, go over it, finding nothing wrong, yet in some puzzling. mysterious manner you have corrected the trouble. But Gus didn't like it. It was too easy.

"I'd better ride around the field with you once," he told Hendricks, climbing onto the step behind the right front wheel, bracing himself on the frame with a knee.

Gus squatted down as they got under way, his ear attuned to the motor, feeling the shower of grasshoppers on his back as they came from the falling and disturbed grain.

As they completed a circuit of the field, Gus dropped off before the farmhouse, waved Ezra on, Blinstock and Hanratty picked up the reins of their teams and began raking and forking hay into the rack for stacking. Mrs. Hendricks, a buxom, gray-haired woman, emerged from the house to greet him.

to see us, Gus, is when we're in trouble," she said, "Now, you come right up to the house and have a snack before you go back to town."



"Now, don't you go to tempting me, Ma Hendricks," Gus protested, thinking

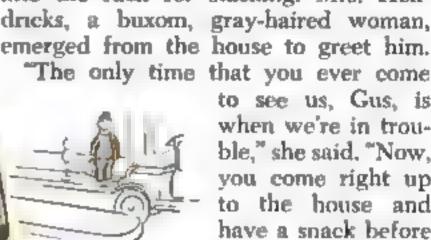
of Stan Hicks all alone at the garage. "And don't you try to dodge me, Gus Wilson," Mrs. Hendricks said firmly, and she took Gus by the arm and urged him toward the house.

In the cool, high-ceilinged kitchen, facing pie and milk that had his mouth watering, Gus paused with his first bite in mid-air. Borne on the wind came the sounds of distant explosions and loud voices raised in wrath. He got up. rammed his hat down on his head and made for the door.

"Excuse me, ma'am," he said. "Sounds like we got trouble again."

At the corner of the field he waited for the tractor, which was coming on slowly, bucking and backfiring. There was a note to the motor that had a familiar ring to Gus, yet still seemed somehow different. He couldn't quite pin it down. The engine seemed to run on all cylinders, then miss on one, clear up, miss on two. At times it seemed to be running on only three of the six cylinders,

Gases from unfired charges gathered



Trouble in the Air.

[Continued on page 194]



A Project for Each Weekend of the Month

Mon	Fuly	195 Wed	54 Thu I	Pri 2	Sat (3).	Shine Up the Car for the Parade
5	6	7	15	16	(17)	Prefair a Take-Apart Wardrobe 136
12	13	14	22	23	24	Build a Pair of Car Ramps
19	27	0	29	30	31	Silence That Squeaky Fleer
20	-/					





Shine Up Your Car for the Parade

An expert shows you how to turn the family bus into the belie of the July Fourth traffic brawl.

By Sheldon M. Gallager

WALTER A. HALL is a guy who likes to wash his ear. Perhaps that's because he is so awfully good at it. In his 23 years as a research chemist in the Finishes Division of Du Pont, "Red" Hall has picked up quite a few pointers on the care and finishing of the old family buggy.

"Why does it always seem so hard to get

a good shine on a car?" we asked.

"Nothing really complicated," Red said.
"Mostly it's thoroughness, plus maybe a
few little things that the average guy doesn't
bother with, like using the wrong cloth or
your wife's laundry soap instead of a special
auto detergent."

We must have looked unconvinced.

"Here, I'll show you," he said, motioning toward a neighbor's car across the street. "There's a dark maroon job, one of the toughest colors to keep in shape. It's not a new car and it needs a bath pretty badly. Fair test?"

We agreed it was.

"How long does it take?" we asked.

"Actually," Red said, "you could do the whole thing in about four hours, pushing it a bit, of course. But it makes a fine weekend job if you wash one day and do the cleaning and polishing the next. That way, you're also sure that the car is completely dry before you start the elbow work."

For the next few hours, we watched while the master worked. The accompanying photos on this and the next two pages show you how you can use the same tricks to put a gleaming finish on your car.



1. HOSE DOWN CAR FIRST to loosen caked-on dirt and eliminate streaks that sometimes occur when washing water drips down over dry parts of car. Never wipe dirt with dry cloth—you'll simply grind it into the finish. Dirt won't come off, but the paint will.



S. REACH, BROTHER! When rinsing top, hood and back, don't forget that spray will push some suds back on clean side, so keep walking around car until all suds are off. Wash suds out of the rain gutter, too, or they'll drip down later and spoil your job.



9. WINDOWS ARE WASHED right along with car, but do need drying to prevent water-spotting while car itself does not. Use detergent suds on outside, merely a damp sponge cloth on the inside, as above, Even stickiest bugs will yield to water and elbow grease.







2. BE SURE TO USE special auto detergent, foamed into suds with hose. Ordinary soap leaves scum that dulls finish; house detergents hold dirt in suspension, may leave it on.

3. START AT TOP and sponge detergent on only half the car at a time. Working in small sections prevents drying of detergent that may cause streaks if it is left on finish.

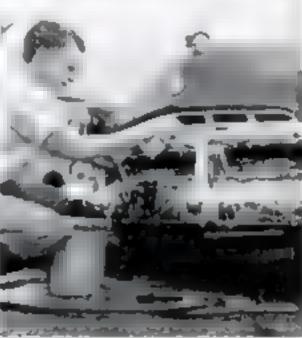
4. RINSE SUDS OFF IMMEDIATE-17 and check for dirt. Very grimy cars may need second or third sudsing for thorough cleaning. Trigger-type hose nozzle controls water easily.



6. FINISHED ALREADY? No, just throwing out the old water and changing to new. This, says Red, should be done twice during the washing to avoid re-using dirty water.



7. PLUSH ALL DETERGENT out of body cracks and under trim so it can't ooze out later and atreak your finish. Rinse sponge often to remove dirt that might scratch car.



WASH CHROME in same way
as the rest of car. Skim only
surface suds from the pail so
you don't pick up dirt settled
at bottom. Humpback sponge
is easy to grip, gets in corners.



10. WHEELS COME LAST. After sudsing and rinsing these, also spray underside of car to wash off salt and other road-conditioning chemicals that may cause corrosion of metal parts.



11. SO YOU THINK IT'S CLEAN? Even after a thorough washing, look what rubs off. This is dead pigment—nothing to get alarmed about, but it's why you need a cleaner, too.



12. RUB, BUB—that's the secret of a really good cleaning job. Red uses a small sponge balled up in his fist and strubs on liquid silicone cleaner with short, brisk strokes.



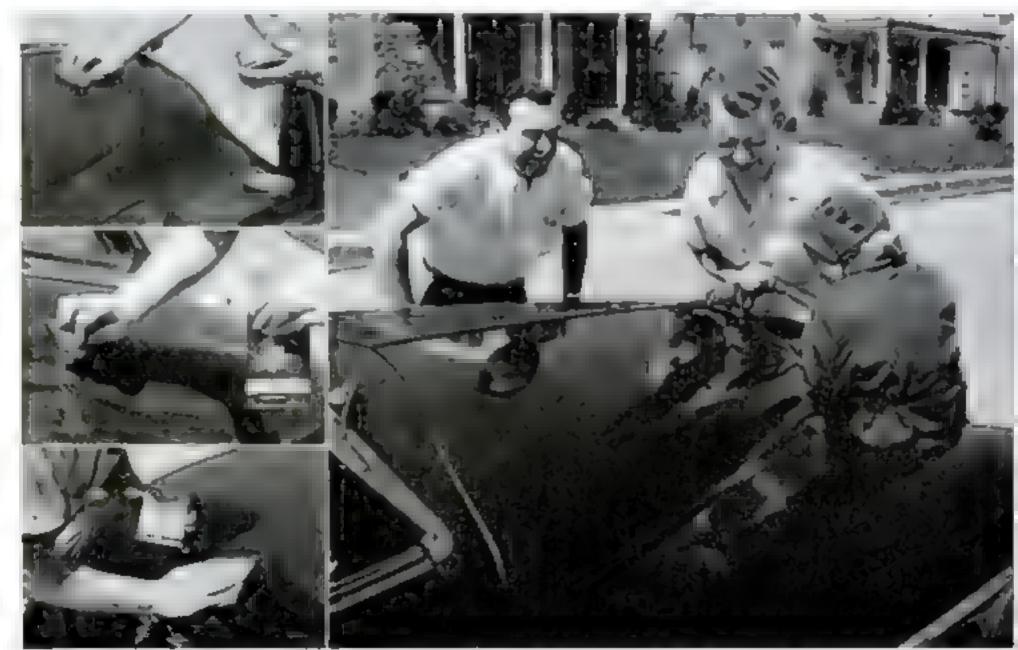




13. CLEANER 15 WIFED OFF with soft cloth—un old undershirt is perfect, or an unsized material such as cheesecloth. On stubborn areas, you may have to apply cleaner two or three times. With slow-drying silicone cleaners, do whole car, then wipe; with others, work in small areas.

14. NICKED THE GARAGE DOOR? Don't worry, ordinary cleaner will remove most paint streaks; if not, use more highly abrasive rubbing compound, but apply it sparingly and wipe on gently so as not to wear away the paint. For taking off tae, asphalt, grease and other tough spots, use tar remover.

15. CHROME POLISH removes light rust and discoloration from bumpers and trim, but keep its abrasive action away from body paint. On heavy rust, use wire brush first. Where rust is beyond removal, you can hide it with chrome paint. Waxing after polishing will help protect chrome.



16. NOW COMES THE POLISH. Here you have a choice of three basic types shown at left above. If you don't mind chow work, you can get a fine, durable finish with paste wax (at top). This is wiped on with a moist sponge, then huffed to a high sheen. Use two cloths, one to knock down thick excess and a second for polishing. Do small area at a time, and don't work in direct sun.

Combination cleaner-poisshes (center) are

good for quickie Jobs, but may not last as long as a two-part cleaning and polishing job. Apply them like wax but more frequently—usually three or four times a year.

Easiest of all, thinks Red, is silicone polish (bottom). This is simply wiped on and off without heavy buffing. If polish is used every six or eight weeks, cleaning step need be done only every third or fourth time.... Car looks pretty slick, doesn't it?

Knock Together a Beach Float

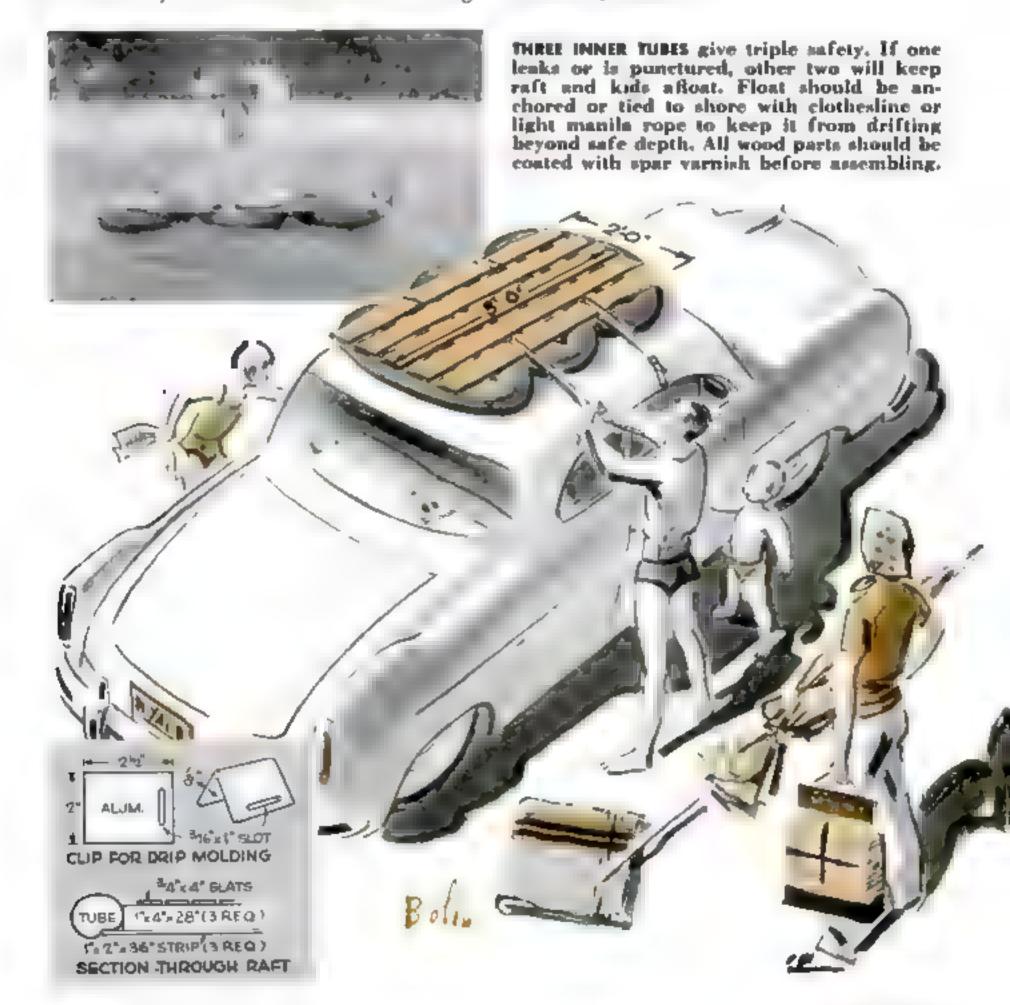
Three inner tubes on a wood frame will give the whole family lots of fun, make swimming safer.

Assemble them over three 1"-by-4" crosspieces, about 2' long. Screw 1"-by-2" strips to the bottom edge of the crosspieces to form a T to hold the tubes.

Bend four clips from X" aluminum to grip the ear's drip molding. Attach them to the float with 1" web straps. Lash equipment on with long straps.—S. Gennings, Port Colborne. Ontario.

THIS light wooden raft fitted with three old inner tubes will easily float several children. It also serves as a car-top carrier for a small boat or beach equipment, providing more room inside the car for the trip to and from the beach. The inflated tubes keep the frame from scratching the car roof.

Make the deck from five smooth slats, %" thick by 4" wide and about 5' long.





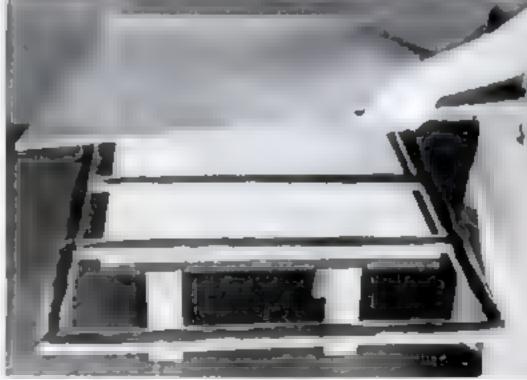
Prefab a Take-Apart Wardrobe for Your Home

You can use it anywhere in the house—knock it apart for moving, or for storing away when it's not needed.





MAKE FRAMES for the seven panels by mitering the ends of the one-by-two pieces. Assemble with nails, glue and corrugated or chevron fasteners. Extra strip on 24"-by-72" side frame, fastened 12" from top, holds shelf.



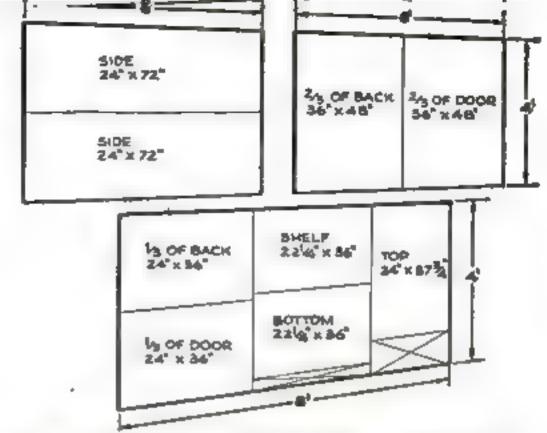
GLUE AND BRAD covering material to one side of each panel. The 36"-by-72" frame above serves for the back or door panel. Position crosspieces so the butting cover pieces, cut as shown, can be bradded and glued to them.



softom FRAME consists of one-by-two glued and nailed together on edge. Cut the 16" length of two-by-four into equal pieces and nail into the corners to support casters. Shelf is a 22 1/4"-by-36" frame without blocks.

FOR day-to-day use, or for storage of summer and winter garments, this knockdown wardrobe will ease the strain on limited closet space. It can be set up in a guest room, game room, attie or basement, or taken apart quickly and stowed compactive when not in use.

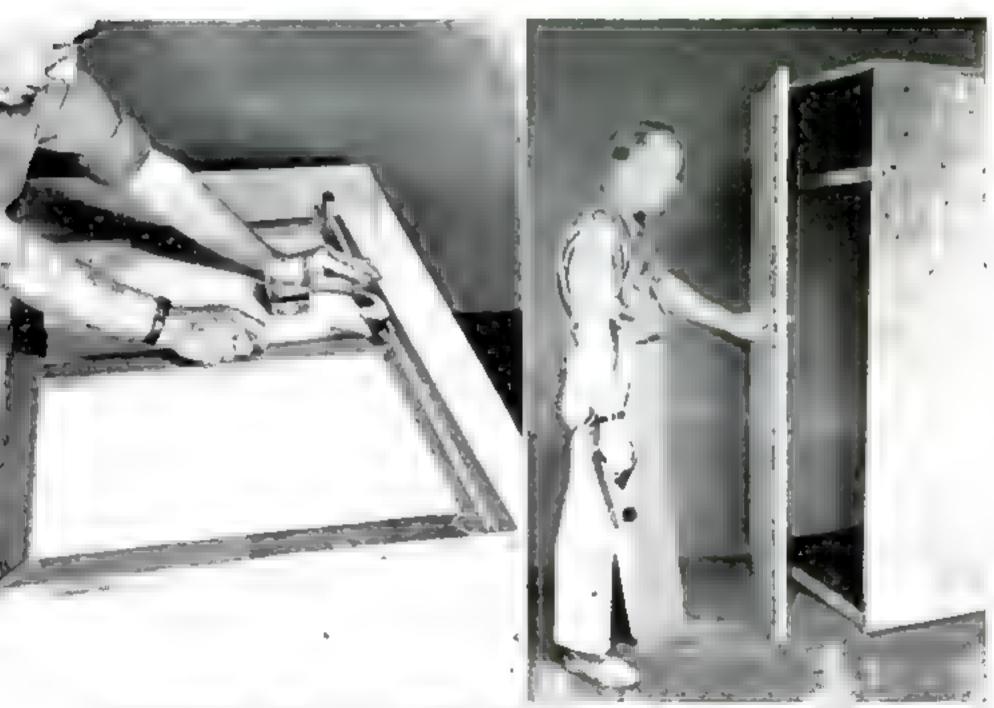
The wardrobe consists of six separate panels joined by wood screws, and a seventh panel fitted with loose-pin binges for the door. Cut the panel from sheets of hardboard or plywood and assemble them on one-by-two frames. Enamel the wardrobe to suit its location, or, for a neater job, use a plastic-surfaced plywood protected by a coat of clear lacquer. —Paul Corey, Sonoma, Calif.



PANEL COVERS can be cut like this from two 4'-by-6' sheets and one 4'-by-8' sheet of ½" tempered hardboard or ¼" plywood. Other material you'll need includes:

12' of 1"-by-2" stock, 16' of 2"-by-4" stock,

1 closet pole 36" long.



WARDROBE TOP is made 24" by 37%4". This allows it to overlap the ends of the sides and hack and project over the door. Mater the ends and glue up the frame. Use fasteners to attach the center brace, too.

ASSEMBLE PANELS with roundhead screws. Fasten pole to underside of shelf with 3" screws: hang door on loose-pin binges and attach pull. Wardrobe can be taken apart by lifting off door and removing screws.



Build a Pair of Car Ramps

These handy elevators will give you more room for under-car jobs. Materials cost about \$3.

IF LACK of headroom is keeping you from maintaining your car or making simple repairs or adjustments on its underside, run it up on a pair of these husky ramps. They'll raise the car about 9", giving ample room to move around—even room to swing a grease gun on fittings that point straight down.

A bundle of short lengths of oak flooring and a 12' length of two-by-eight provide enough material for two ramps at a cost of

slightly more than \$3.

Lay out the sides on the piece of two-byeight so that one diagonal cut will produce two sloping surfaces. This way, you'll save cutting as well as lumber. Clamp the sides

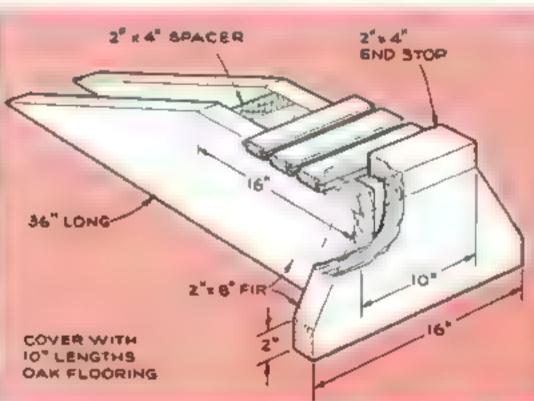


in pairs and plane them smooth. Cut the two end pieces from the remaining two-by-eight. Stand the sides on edge, about 3%" apart, and nail the end pieces to them. Nail a 2"-by-4" spacer on edge between them at a point just before they start tapering.

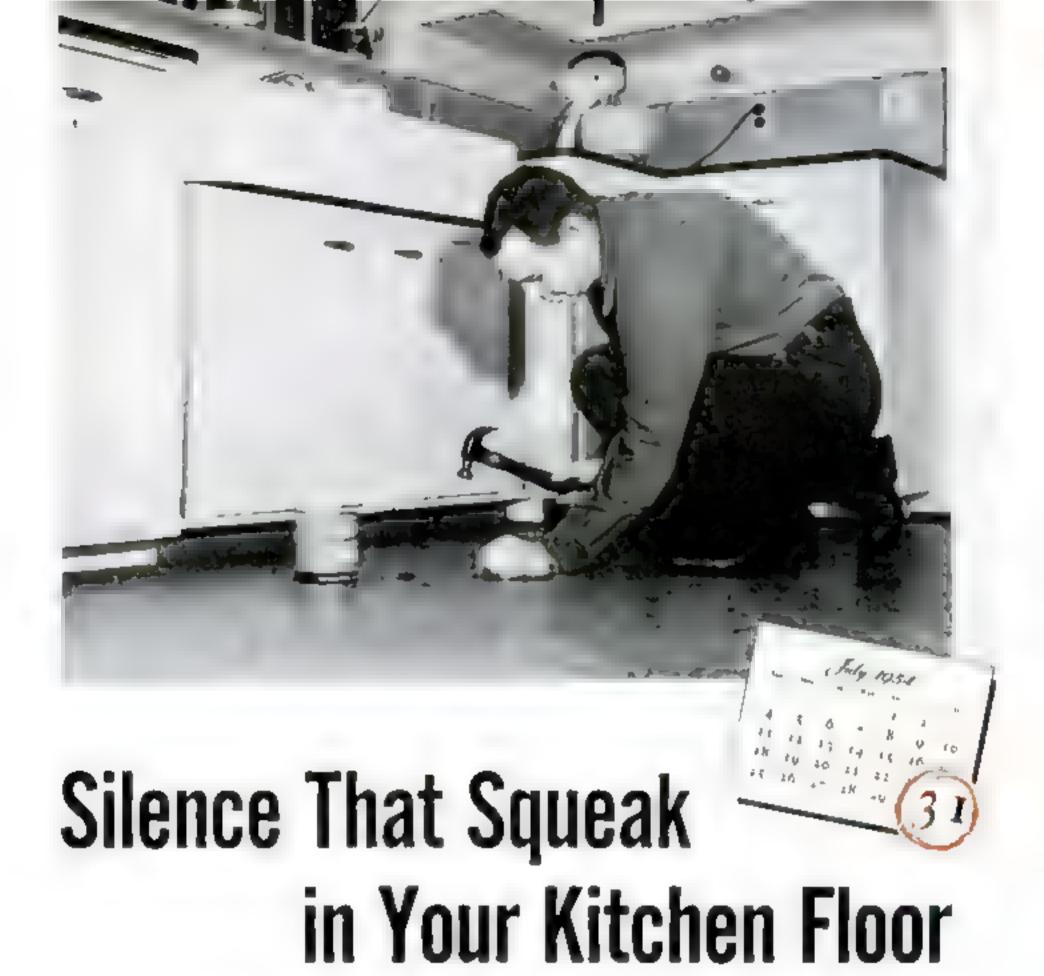
Cut the oak flooring into 24 pieces, 10" long, and nail them across the body. Space them out evenly so that there are five slats on the level part and seven on the slope. Nail a 10" length of two-by-four across the end of each ramp. This will prevent the car from rolling over and off them.—Herb Pfister.



PLACE THE RAMPS shead of the front wheels, sighting back to the rear wheels to line them up. If the repair job is at the rear of the ear, back it up on the ramps.



WIDE END PIECES make ramps tip-proof, let you turn the wheels from side to side for access to grease fittings on kingpins and steering-arm ends, Block at end stops car.



Why put up with noisy gremlins underfoot, when you can easily drive them out without removing or damaging the floor cover?

THE other day I stopped at a floor-covering store to ask how to get rid of squeaks in my kitchen floor. Every time you stepped on some spots, the noise was enough to rattle your evereeth.

He could fix that, the man said, First he'd rip up the old linoleum. Then he would renail the subthoring and the underlayment subdly to the joists. That would stop the squeaks, and what kind of new covering did I want—linoleum, or asphalt, rubber, cork or vinyl tile?

Clutching my wallet hard, I got out before he could snatch up a sample

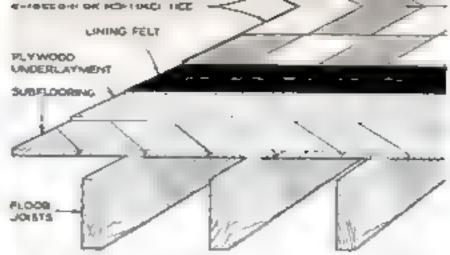
Since I couldn't cough up for a new floor,

it seemed we would have to learn to live with a noisy one. It was worst in front of the sink. For the sake of my nerves, I told my wife that I ought to make it a point never to wash the dishes.

This solution did not appeal to her, and that night, before I got to the cups, I knew the squeaks had to go.

The basement runs underneath our kitchen. So first I went downstairs and—but I'll let the pictures take it from there. The job didn't take long, and there isn't even a mouse-sized squeak left. For how I did the job, please turn the page.—John Burroughs, Tacoma, Wash.





THE PARTS OF A FLOOR are diagramed above. In a kitchen, moisture may warp the underlayment. Bulging, it pulls the nails up, your weight presses it down, and squeaks occur. If there is a cellar under the floor, you can check the subflooring by trying to slip a putty knife between it and the joist, as at left.





AFTER LOCATING A SQUEAK, chalk the spots where the floor joists come. To do this, measure in the cellar from one joist to a water or steam pipe that goes up through the floor. Then you can measure from the same pipe over the linoleum. Joists usually are 18' apart. Chalk all the joists near the squeak.

AS NEAR THE CENTER of the noisy floor area as possible, cut a corner flap in the floor covering directly over a joist. Use a sharp knife, tently lift the flap, being careful not to break it off thatting along a streak or square in the busileon pattern will help considerably in biding this necessary surgery.

With A 9'64" DRILL, make a pilot hole through the plywood underlayment and subfloor into the joist beneath. Drive in a 1½" No. 6 wood screw until the head is sunk thish. If the pilot hole is the right size and the joist beneath is sound, countersuking the screw probably will not be necessary. Other fastenings you can use include spiral-shank, ring-harbed or cement-coated nails.

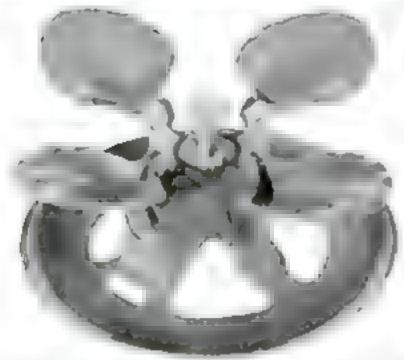
MOW OUT THE CHIPS. Then cont the underside of the flap liberally with asphult-base implement centent, press flap back, and from it down with a putty-knife handle or other blunt object. Clean off excess with a rag moistened in solvent. Weight the patch until centent dries, One screw may quiet an area several feet across: if more are needed, bear outward from center, using one at a time.





New for the Handy Man

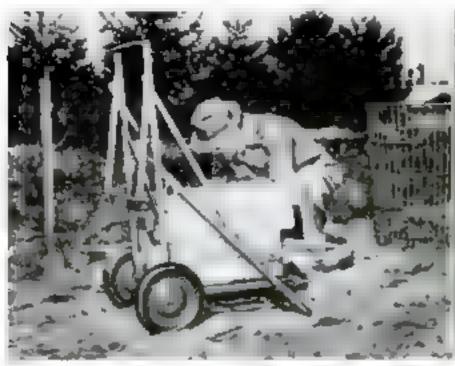
1. Plans Show Home Wiring. You can do all of your own home wiring with this set of plans. The three 18"-by-29" blueprints show typical installations for lighting fixtures, wall outlets—even electric ranges, driers and fuse boxes. All parts needed are described on an accompanying sheet so that you can tell exactly what to buy.



2. Sprinkler Sprays Anywhere. You can put water just where you want it with this lawn sprinkler by the way you tilt the four hinged deflectors. With all deflectors flat, you get a full 30' circle; with one tilted up, a half-circle; and with two up, a quarter-circle. By changing the angle of tilt you can also vary the area covered.



3. Frame Mounts Sink Quickly. Kitchen sinks can be installed in a few minutes, using only pliers, with this special frame. Metal tabs around the edge are simply bent one way to lock the frame to the counter and the other way to lock the sink to the frame. Being tapered, the tabs allow for varying thicknesses and wedge tightly on.



4. Garden Cart Does Many Jobs. This wheeled cart makes a useful hand truck for hauling up to 200-pound loads. With a



hook-on canvas bag, it's handy for toting laundry or collecting leaves and trash. The cart collapses for storage.



5. Mower Gets Mulcher. A metal grid, quickly attached to this rotary power mower, shreds leaves and grass cuttings into fine particles that need not be raked up

after mowing. The staggered wheel arrangement keeps blade from digging in on uneven terrain, permits cutting to within *" of obstructions, saving trimming.



6. Can Disposes of Garbage. Essentially a bottomless garbage can, this container not only holds food waste but disposes of it as fast as you put it in. The can is sunk in an 18" pit, where a chemical action liquefies bones, eggshells and other food, carrying the waste safely away below ground. A small amount of chemical starts the action, and from then on the disposer will work five to 10 years without attention.

7. Bracket Speeds Ladder Work. This tubular-steel bracket clamps quickly to the top of a ladder, holding it away from the house for easier painting of eaves or handling of storm windows and screens. It adjusts to any ladder angle and can also be hooked over the roof, providing handrails for safer climbing up and over the edge.



Further information on the products shown on this and the preceding page can be obtained from: 1. Home Building Plan Service, 2454 N + Sandy Blod Partland Ore., 2. Majestic Mfg. Go., 4570 Gasting Ave., St. Louis 16. Ma, 3 Mackinburg-Dunena Co., Bus 1197 Okiahuma City Okla., 4. Cancar & Metal Specializes, Inc. Graveville, N.1., 3. RPM Mfg. Co., Lamor, Mo.; 6. Bordmatic Corp., Huskegon, Mich., 7. Clayton Mark & Co., 1900 Dempiter St., Ecansian, Ill.

You can dine out tonight in your own back yard

Quickie Fireplaces for Outdoor Cooking



Three concrete blocks, a grate and an appetite can turn your yard into a real Garden of Eatin'.

By John C. Campbell

Rural Housing Specialist, Oregon State t. Lege

IN CASE you get a yen for charcoal-broiled steak at five some afternoon, you can have just that for dinner provided you rush out and buy (1) the steak, (2) three standard concrete blocks costing a total of about a dollar, (3) a grate from an old kitchen range or refrigerator, (4) a bag of charcoal if you have none on hand.

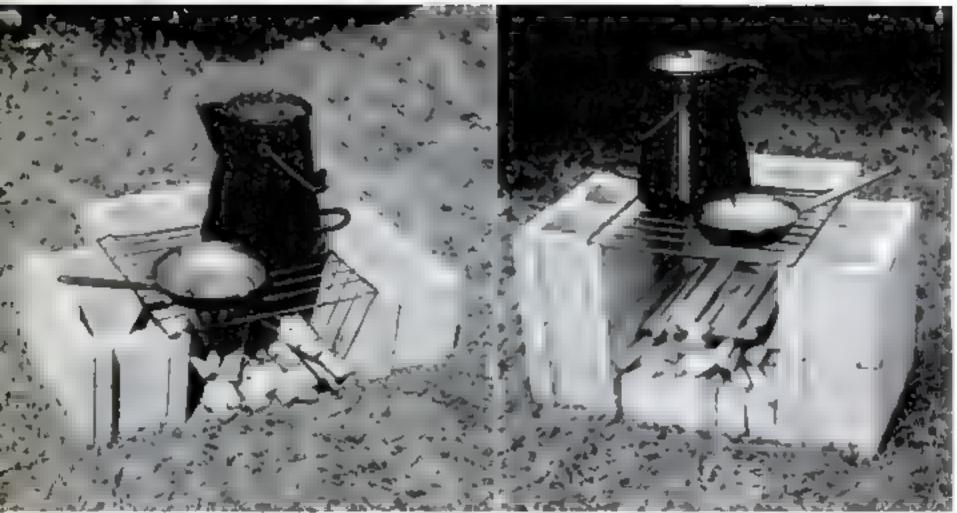
The fire will take you longer to build than the fireplace. Just lay the three blocks, put the grate across them, and—yum! what's

cooking?

No fooling. It really is that easy. Probably nothing you can add to your back yard will provide more get-together-at-home

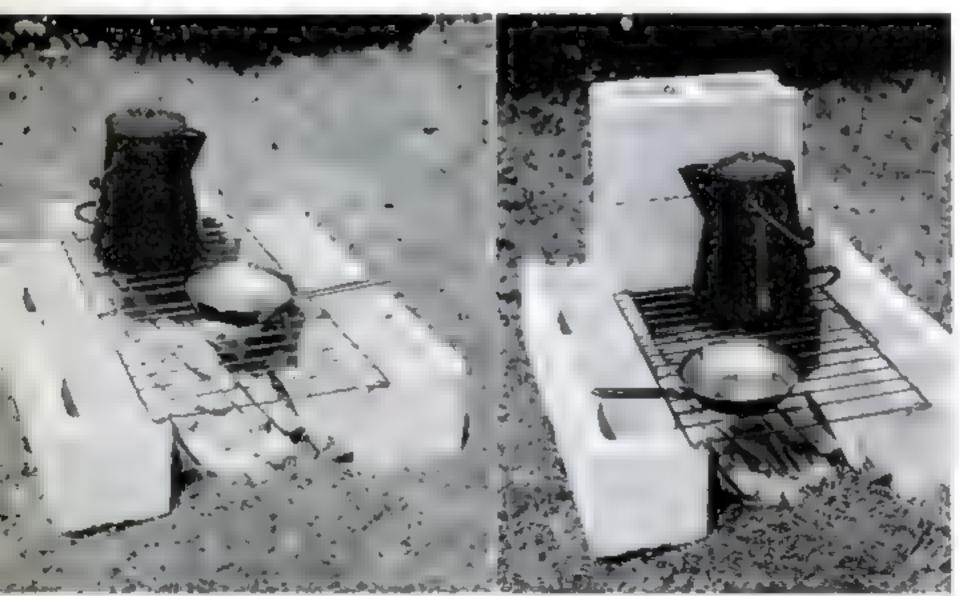
pleasure than an outdoor fireplace. A supper in the back yard rounds out a full and happy day when you're back from work or from the beach. Friends are easy to entertain in the informal atmosphere of the outdoors.

If you've thought that building an outdoor fireplace is too much work, or costs too much, consider what you can do with concrete blocks. Not only the three-block quickie already mentioned, but more elaborate permanent units can be built in less than half the time a brick or stone unit would require. Keep it simple and you'll be having fun before you think it's work. For other ideas on outdoor during, see the next five pages.



QUICKIE FIREPLACE consists of three 8-by-8-by16 concrete blocks with a grate salvaged from
an old oven or refrigerator laid across them.
It provides a firebox closed on three sides to
conserve heat, it can be faced into the wind
for draft, and the cooking surface is near
the fire to make best use of the heat.

STIFF-KNEED CHEFS will appreciate a somewhat higher fireplace. A second row of blocks brings the grate to a more convenient height. The fire is built on a floor of ordinary brick to keep it within 12° of the grate. Blocks are set up without mortar, making the fireplace easy to disassemble.



KING SIZE OR LONG JOHN gives you a higger cooking surface. If guests drop in, just add two more blocks and a second grate. There's plenty of room here to cook as fast as they can eat. Lacking charcoal, wood will give a hot fire, but may send up more smoke.

ADD A CHIMNEY for more draft and better smoke control. This is only practical with the two-block-per-side fireplace, as a single block does not provide enough depth. The back is closed in with a fifth block and chimney blocks are stacked in front of it.

Use Blocks for a Permanent Fireplace, Too

IT TAKES surprisingly few concrete blocks for even a good-looking unit like this, and they are so big the job takes shape fast.

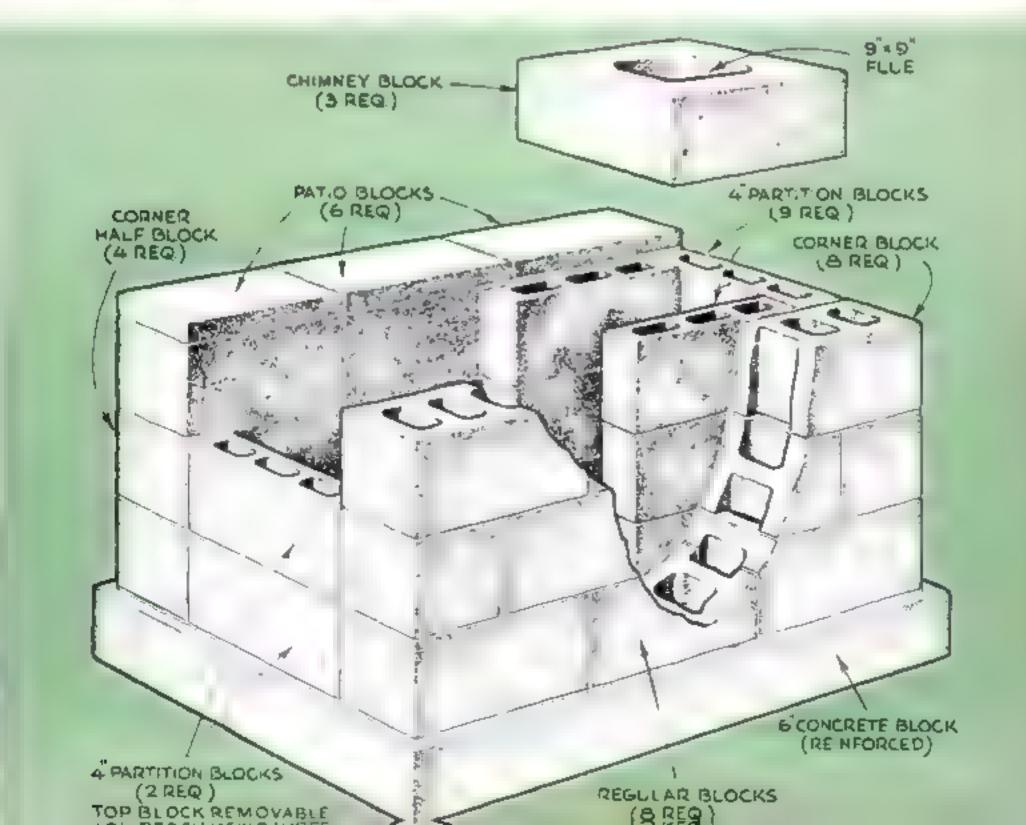
In freezing climates, a 6" thick reinforced foundation slab is desirable to prevent cracking. Use welded wire reinforcing or 4" rods 10" apart, running both ways

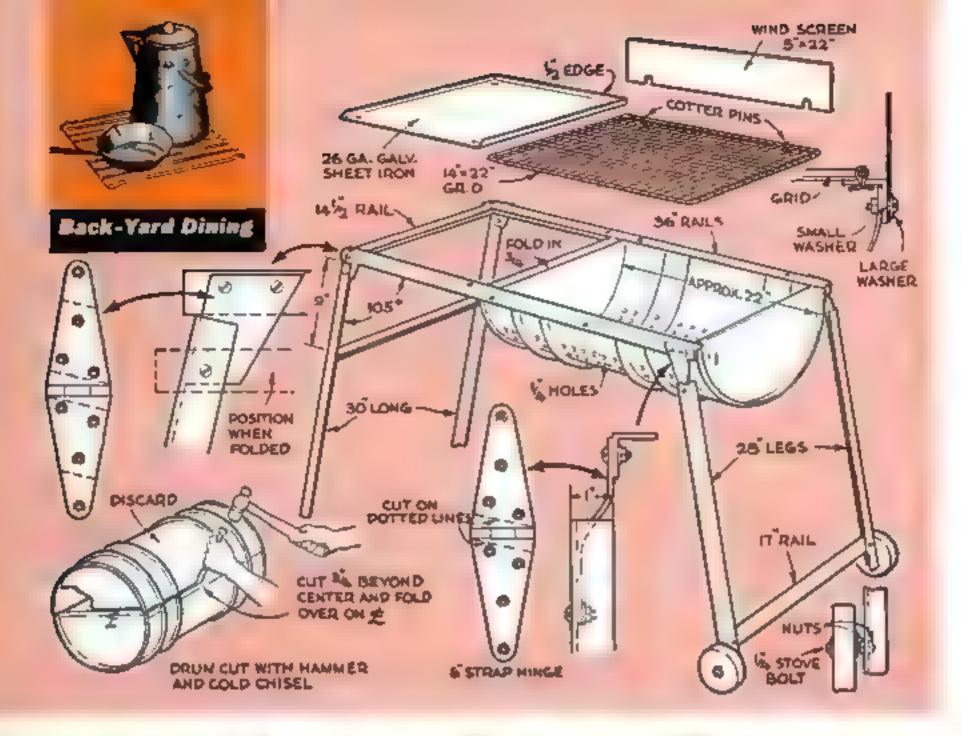
For mortar, mix one volume of cement, one of hydrated lime, and five of mortar sand, or buy the mortar ready-mixed. Eight regular, eight corner, and four half blocks are needed, plus 11 partition and three claimnes blocks. The partition blocks, which are half the thickness of ordinary ones, form the back and inside ledges on which the channey rests. Two similar blocks are used for the front. Fill the space between with sand to provide a fire surface of suitable height. The patio block also comes in half sizes, so it can be staggered if you like

A solid metal plate is shown in the photo above, has advantages over an open



grill. It insures more positive draft and confines the smoke to the chinney. Leave it removable in case you want wiener toasts Coment only the lower front block, a second loose one can be set in to control draft.





Oil-Drum Barbecue Folds for Storage

ABOUT two dollars indiciously spent at a junk yard will provide most of the materials for this folding back-varil grill Get a small oil drum, about 18' of 1" by 1" angle iron, and a refrigerator grate.

First, cut the drum lengthwise, leaving and tales at the ends. Fold these over. Then cut angle-iron side rails 36" long. Drill holes to bolt them to the drum in at least three places. Cut and fit the end rail and

bolt or rivet it and the drum to the sides

Pivot plates for the legs can be cut out of strap binges, as shown in the drawing, although any plate of similar thickness will do. If the legs are mounted at an angle of about 105° when open, they will be stable without braces. The plain legs should fold inside the wheeled ones, so the latter are set out 1" on each side by bending an offset in the pivot plate.

After the legs are in place, set the frame on a level surface to determine where to drill the wheel-axle holes, since this will depend on the wheels you use Any from 4" to 6" in diameter will do.

Drill the draft holes in the bottom of the drum, bend up three sides of a 15" square of sheet iron, and bolt it to the frame Attach the grate with cotter pins as shown in the drawing. Make a sheet-iron wind screen with %" turnovers on three edges and slot the lower edge in two places for mounting

Wire-brush all parts clean. Then apply metal undercoat and two coats of outdoor enamel. When these dry, you're cooking with fire,—Ralph S. Wilkes, Keuka Park, N.Y.

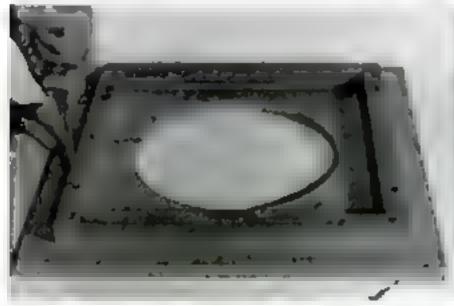


Portable Charcoal Stove Can Be Used Indoors or Out

By John Rogers

coal stove, or hibachi, provides hot food both for outdoor buffet suppers or, if you like, indoors on the fire-place hearth, where the smoke will go up the chimney. The fire is built in a 10" cast-iron casserole, costing about \$3, and the wire trivet supplied with the vessel is converted to a grill by crisscrossing two pieces of wire through it to rest on top.

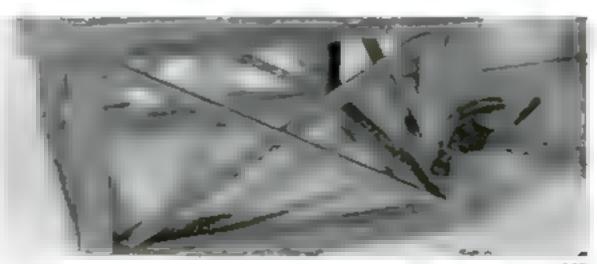




CUT OUT A HOLE in the 18"-by-18" wooden top to fit the cast-iron casserole. Top should be 34" thick. To let the pot sink flush with the surface, receive the handles. A 15"-by-15" frame of 1"-by-1" stock is screwed fast to the underside of the top.

MAKE ANOTHER FRAME for the bottom just like the one screwed to the top. Then cut corner posts of 1"-by-1" stock 7½" long. Glue and toenail these posts to both frames, top and bottom. Use No. 3 finishing nails, well set and puttied over. Assemble posts on base frame first as shown.

square stock by mitering a corner on each end to fit within the frame. Glue and nail one brace flush with the inside edges, and the other with the outside edges, using 1½ " wire nails. Line the inside of the hole with sheet usbestos to keep the hot pot from charring the wood. Clear or colored lacquer, waxed, makes a good finish.





Round-the-Tree Table Has a Lazy Susan Tray



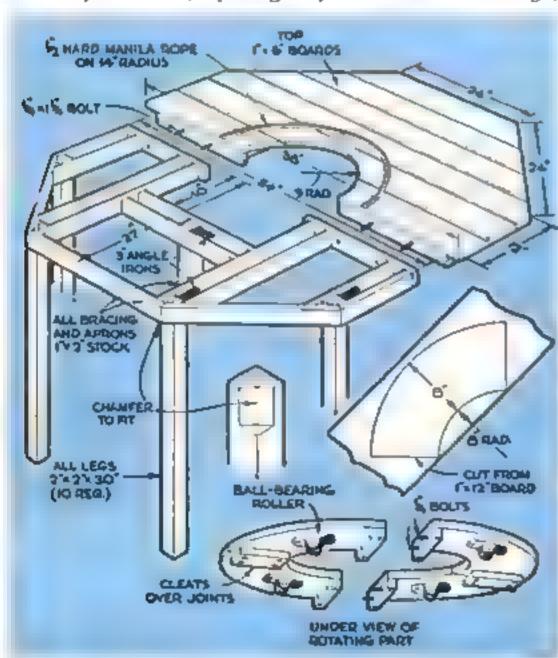
THAT barbecue will taste even better around a comfortable table like this. A Lazy Susan in the middle turns to bring the trimmings within everybody's reach. Its eight sides will seat eight diners, with plenty of elbowroom between. Unscrewing four wing nuts lets you remove it from around the tree for winter storage.

Begin by making the two frame halves of 1"-by-2" stock, spacing adjacent cross

members to a close fit for the leg stock. Assemble with six-penny finishing nails. Chamfer the corners of the legs as required to fit into the corners, screw on 3" angle-iron brackets flush with the top ends, and nail the legs in place. The top shown was made of redwood shiplap, with the joints drawn close and the V notches upward. Ordinary boards, left with small gaps for drainage, will also do. You can use four-

penny finishing nails, set and puttied over, to fasten them to the frame. Then screw the legs of the angle irons to the top. With composition-wood or other weatherproof filler, fill the grooves in the circular area over which the Lazy Susan caster rollers will travel.

The Lazy Susan is made of four quarter-circles, cut as shown with the long grain of the board. Screw two %" cleats over opposite joints, and bolt cleats to both members of each of the other joints. The easters are screwed on at quarter-circle intervals. To keep the Lazy Susan in place, nail a circle of rope to the table top as shown, or tack on a track made by bending light aluminum angle to a suitable radius, first slitting the flat, or nailing, flange to prevent kinking. Add a rim to platform by nailing linoleum binding or some flexible metal around edge.-Wilma Mitchell, Glendale, Calif.

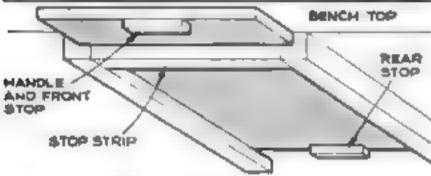




Baby Buggy Rolls on Sand

A BABY carriage will roll right down to the water's edge at the beach this summer, if tin strips are wired to the wheels like this. Equipped with the wider tread, the wheels then won't sink so far into soft sand.





Leaves Add to Workbench Area

ONE or more pull-out boards like those in the photo above are worth adding to any workbench. When the bench is littered, you need only pull out a board to have a clear working surface. They also are handy for supporting outsize projects.

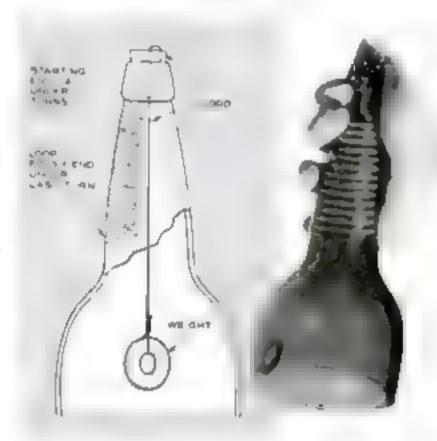
Make the leaves of %" plywood for strength. Screw heavy rabbeted guides to the underside of the bench top with a strip across them at the top. Add a stop block at the back of each board and a handle to pull it out by.—A. Roger Grout, Meadville, Pa.



Rooting tim, in strips about 4" wide, was used in this case, the strips being cut long enough to go around the wheels with a 3" overlap for fastening. Holes punched in the tim allowed the strips to be pulled up snug against the tires and then wired securely in place.

In time, the edges of the strips may crinkle somewhat, but this does not seriously take away from their traction value.

—John Hoke, Washington, D. C.



Cut-Down Bottle Rings the Bell

HERE's a conversation piece that speaks in ringing tones. Cut a long-necked bottle by scribing around it or using an electric resistance wire (PSM, Feb. '54, p. 196) and grind the edge smooth.

Draw a piece of fish line through a hole in the center of a cork, the on a small sinker and drive the cork in tightly. A wrapping of raffia or plastic lacing around the neck makes a nonslip grip.

ROY PINNEY scans sea-life scene with movie camera. Equipped with only swim mask and fine, he can stay under water for 60 seconds.

DRAMATIC UNDERSEA PARADE. To attract fish, use an angler's trick; drop toast or bread into the water and they'll come swimming.



SEA ANEMONES, with fragile fingers waving, caught in close-up against coral background. You needn't go deep for beauty like this.

150 POPULAR SC ENCE

His Photo

This diving cameraman captures

By Dave Stanley

IF YOU can swim you can take pictures under water. You don't have to be a deep-sea diver. You don't need a lot of fancy and complex equipment to bring back on film the mystery and beauty of the silent

Action accents this fine portrait of a hawkshill



Studio Is Under Water

a weird and wonderful world. You can use many of his tricks.

world that you will discover under the sea.

Next to a camera in a watertight container, probably the most important equipment you can take down with you is some tips and words of advice from a veteran underwater photographer. One of the best is 42-year-old Roy Pinney

A naturalist-photographer for more than 20 years, Pinney photographed the William Beebe bathysphere descent in 1936. Since 1949 he has been nosing his cameras into the clear, warm waters off Bermuda and Nassau, shooting picture stories of underwater lite, spear fishing skin diving. So

turtle. It was shot at a shallow depth to take advantage of sunlight penetrating the water.



he knows what he is talking about when he exclaims enthusiastically, "There's literally a new world down there for cameramen to conquer,"

He also knows what he is talking about when he warns the amateur to keep his distance—six to 15 feet from the underwater

subject. "Once you get outside that area," he suys, "vou're westing film. Your pictures will be fuzzy and murky."

The reason for this shooting rule is the loss of light

under water. Sometimes you can bend the rule a little. That sometimes is when there is sparkling sunlight overhead and bright reflection from a white-said bottom.

If you've just bought yourself fins and a swim mask, and your first watertight camera is ready for action, don't start plumbing the ocean depths as if you were going to film "20,000 Leagues Under the Sea." Pinney's advice: "Start shooting in shallow water—five to six feet. You will get experience handling your equipment and you can stand on the bottom if necessary."

That doesn't mean, however, that the camera-toting wader won't come up with some good stuff. On the contrary. The shal-

lower the water the stronger the illumination, with better chances for good pictures photographically. And, Pinney reminds, there's a wonderful parade of marine activity and plant life in shallow water from five to 10 feet,

Now that you're down, the camera has

a jetty That isn't always easy when currents start bobbing you around. Weighting the camera helps. Attach a few pounds of lead weights, enough so that the

camera sinks slowly; it will neutralize the

buoyancy of the water.

-HUGH LOSSBACK

... HINT TO AN UNLUCKY HANDY MAN .

One man can't think up everything

But there's no use denying-

You won't invent a single thing

Unless you keep on trying!

In time you will be hired down into deeper water. Then you will need lead weights for your own body. "I've used a lead belt weighing from 20 to 30 pounds," says Pinney. "How much weight you need depends on your own weight and how far down you want to go, Before you go down, make a safety check to be sure that you can unclasp the belt with zipper speed in an emergency."

Camerawise, here's what Roy Pinnev carries for his underwater photography: (1) a Clarus 35-mm. camera enclosed in a Plexiglas container: (2) a Cine-Kodak



A SPECIALLY DESIGNED plastic case encloses photographer Koy Pinney's Clarus camera.

WATERPROOF CASE, or glass jar with tight lid, enables exposure meter to be used in water.



Underwater photography often results in a good meal, too-as witness this huge crayfish.

magazine, 16 mm., with a homemade watertight container,

Speed is a keynote in his choice of film and lens. "I use high-speed panchromatic, super double X. For color I use a very fast lens, f/3.5 or faster."

In shooting, he reports good results by clicking at 1/100 of a second for black-and-white; 1/50 of a second for color.

When it's slightly overcast, shoot half as fast. "This is not true all the time," Pinney qualifies. "There may be a lot of reflection from white sand on the bottom."

Today, most spear fishing and underwater photography centers around the Bahamas, Florida and California. But America's thousands of lakes and endless miles of rivers offer a creative challenge. "In lakes and rivers," Pinney points out, "you can take interesting shots of your girl friend, swimming meets and other water sports.

And if you are quick-eyed and lucky, you may even catch a beaver or muskrat."

Experience has taught Pinney never to be careless under water. He has set up a safety program for himself—and you:

1. Never swim under water without

friends nearby.

2. If you scratch yourself on coral, get it cleaned at once. Otherwise festering sores may result.

3. If you have allergies or sinus trouble, check with a doctor before taking your

camera under water.

 Watch out for sea urchins. These fish have spines. If you step on one, see a doctor.

5. Wear foot fins if possible. Not only do they propel you faster, but they protect your feet against broken glass, jagged coral and those spiny fish.

"Take it down from there," says Pinney.

"It's fascinating fun."

END

JULY 1954 **[53**

What You Can Do Viewers With

Don't throw away those 3-D movie specs. You can photograph fish with them, make a peep box or peephole, and play engineer.

By Walter E. Burton

THAT cardboard viewer you may have L tossed away as you came out of the 3-D movie still has lots of entertainment value left in it. If you take one home, you will be able to peep into some fascinating new worlds.

What opens the windows on these is the viewer's ability to polarize light. Ordinary light vibrates in all planes perpendicular to its line of travel. But the polarizing material in 3-D viewers acts somewhat like an infinitely fine grating, which blocks vibrations at an angle to it and passes only those in the same plane. This screened light is polarized.

For 3-D movies, the two polarizers are set at right angles to each other. Cut the viewer apart, place one eyepiece in front of the other, and you will find that little or no light gets through. The diagram shows why. One polarizing element cuts off all light except that vibrating in its own plane. The other element, at right angles to the first, cuts out this residue.



Pur bits of clear cellophane or mica into this gadget-then look through it into a wonderland of colors! Punch a X" hole in two bouillon-cube can caps and cut out as much of the bottom of a can as possible. Cement one polarizing element and a small lens on top of one cap, press on the second, and scrape the paint off the can so that the assembly can be rotated on it.

Fit a disk of clear plastic or cellophane at the focusing point. Drop scraps of clear film on the disk, hold the can over a brightly lighted surface and look through. The colors change as you turn the top or shake the box.



But turn either element so that the "gratings" come more nearly parallel, and more light passes through You can use this effect in several ways—for instance, as a light dimmer on a microscope or a miniature stage, or to view visitors through a peephole in the door.

And that's not all On these two pages, and the one that follows, you'll see how polarization can do such tricks as reveal colorless things in startling hues, make physical stresses in materials visible, and help you take photos of objects under water.

See Strain Inside Solid Materials

ENGINEERS can tell where strains are concentrated in girders, bolts, turbine blades and other parts by illuminating plastic models of such things with polarized light. Place one viewer element behind a bit of plastic and direct a lamp to bounce light



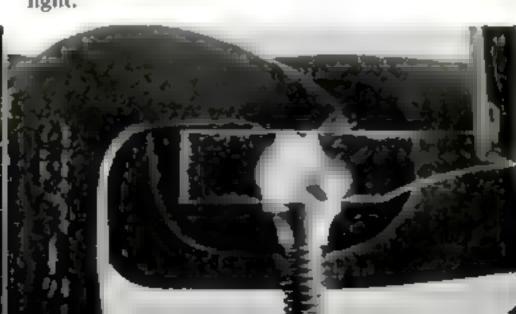
A POLARIZING filter on your camera makes it possible to photograph fish under water or get a clear picture of objects in show windows. By eliminating glare, it brings out depth and contrast in color photos. Cement a 3-D filter element to a cardboard disk cut to fit into a sunshade or filter holder, as above.

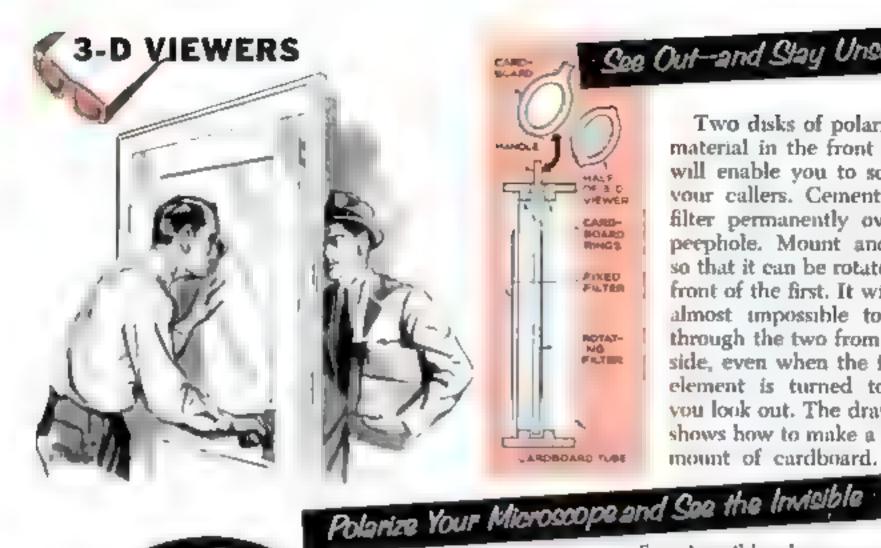
Hold the filter before one eye and turn it until glare and reflection are at a minimum. Then place the filter on the camera in the same position. (With a ground-glass or reflex camera, you can observe the filter's effect directly.) Increase exposure 2% times to compensate for filter light loss. For the best underwater shooting, the angle between water surface and filter should be about 35°.

off a white background through the plastic Place another polarizing filter in front of your eye.

Depending on how you turn the filter, strains set up in the plastic by clamping, twisting or bending it will show up as bright spots against dark, or dark spots against light.







Two disks of polarizing material in the front door will enable you to screen your callers. Cement one filter permanently over a peephole. Mount another so that it can be rotated in front of the first. It will be almost impossible to see through the two from outside, even when the inner element is turned to let you look out. The drawing shows how to make a filter mount of cardboard.

See Out-and Stay Unseen

BOARD

PIXED

ROTAT-NO.

SOME CRYSTALS of colorless chemicals glow with rambon

THE invisible shows up when polarizing filters are added to i microscope. Many transparent or translucent objects barely visible by ordinary light show brilliant, colorful detail. when viewed this way

Lape one viewer element to the underside of the microscope stage (bottom left). This will polarize light passing through the slide Stick a second bit of polarizing material over the eveniece lens (bottom right). If the eveniece cannot be turned in the barrel, mount filter on a separate can or ring to permit it to be rotated. Try lacking at hairs, textile fibers and potassium chlorate, Epsom salts and copper sulphate



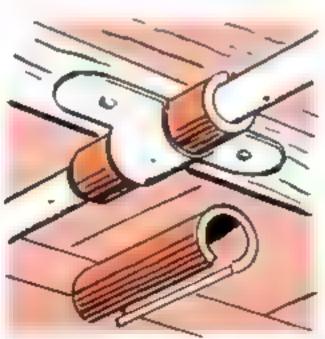




After oiling an electric fan, place a large paper bag over the wire safety cage and run the fan for a few minutes so that the bag catches any oil spatters. A very large fan can be covered with a paper garment bag, shortened to fit the height of the appliance.

Pipe brackets will take a tighter grip if a short piece of slit garden hose is slipped around the pipe before each bracket is mounted in place.

To discourage insects from attacking you on open porches or patios, replace white lamp bulbs with yellow ones. Tests show that white beams attract 220 percent more bugs than yellow lighting.



KEEPING THE

Home

SHIPSHAPE



Painting drawer knobs is a snap if you leave the screw in place so you can clamp a clothespin over it. This gives you an easy-to-hold handle for turning the knob as you paint.

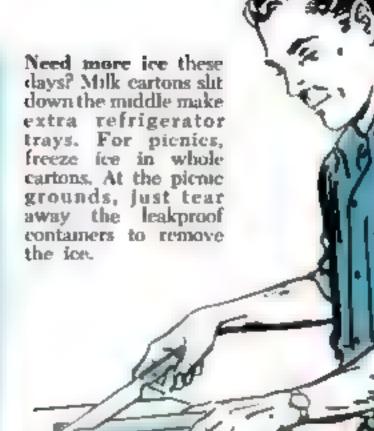


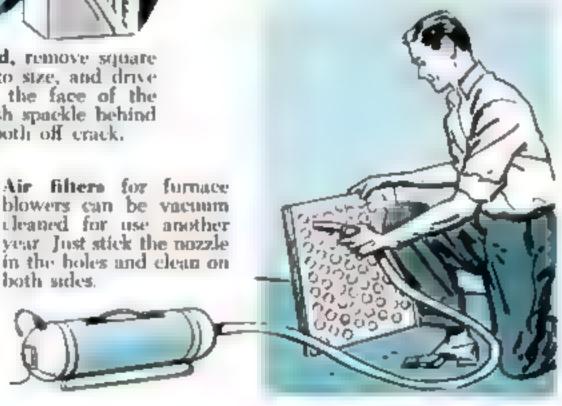
If mildew is a problem in an unventilated ceilar closet, try washing the fungus area with ammonia. When thoroughly dry, apply a couple of thin coats of fresh white shellac.

More Home Tips



To patch plaster with plasterboard, remove square of plaster, drill holes in patch cut to size, and drive Hatheud screws into lath to bring the face of the patch flush with thicker plaster. Push spackle behind patch to hold it in place. Then smooth off crack.







A rusted garbage can that has broken through at the bottom can be salvaged to hold dry rubbish. Upend the can, cut a tight-fitting circle of tempered hardboard and insert it in the bottom of the container.

SCUITS

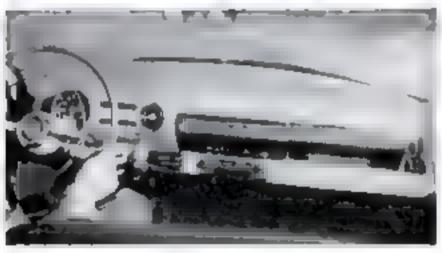
both sides.

A night-light bulb turns any drawer or cupboard shelf into a crisping bin. If you have a cabinet with an outlet nearby, bore a hole, push a wire through and attach a lamp socket. Plug in the lamp a few hours every day



New for Your Car

1. Plastic Lenses Guard Headlights. These lenses fit over standard headlight lenses on all cars, protecting them from dirt, stones and insects. Quickly installed under the headlight retaining ring, they add to a car's appearance and make the lights visible from the side at night.



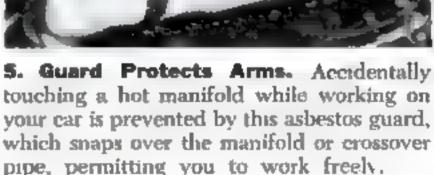
2. Crash Pad Sticks on Dash. You can install this decorative crash pad in less than a minute, simply by removing the paper from the pressure-sensitive back and pressing it in place. Aside from dressing up your car's interior, it eliminates glaring reflections that bounce off the dash. Made in a variety of colors, it is available for most late-model cars.



3. Curtains Give Privacy. Sleep in your car or change clothes at the beach in privacy by drawing these curtains to close the entire car from outside view. They slide on chrome traverse rods which are attached to the roof upholstery by large pins. The rear of the car can be closed in by transferring the front rod to the center of the car, giving the driver full vision.

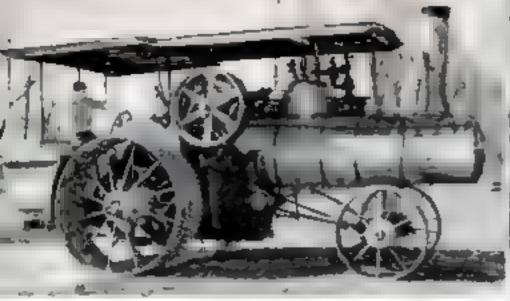


4. Reflectors Outline Driveway. You'll garage your car safely at night with these 8" chrome reflectors lining the driveway. They are sold in pairs, or the heads can be bought separately for posts.



Further information on these new car products can be obtained from: 1. Gaylord-Shelton Inc., 1918 S. Prairie, Chicago; 2. Cosmopolitan Enterprises, P. O. Box 2034, NB Station, St. Louis 13; 3. Auto-Cabona & Cartain Co., P. O. Box 222 Syracuse N F; 4. Cartrack Products, 3243 W. 33rd St. Clese-land; 5. Allen Rick Co., 7935 Chase Ace., Los Angeles.





Twelve tonner. Newer than most of Willock's machines, this Baker Special steam traction engine, largest of its make, was built in 1925 by the A. D. Baker Co. of Swanton, Ohio. It has a single-cylinder, piston-valve engine, 10" bore by 10" stroke, that has in actual tests developed 99 brake horsepower. The Bywheel (seen in

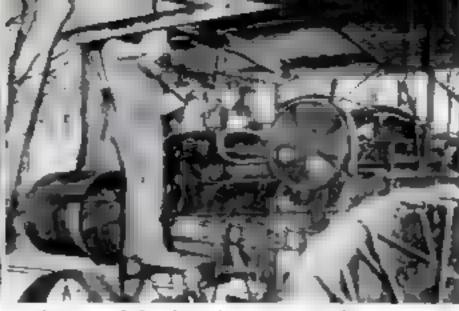
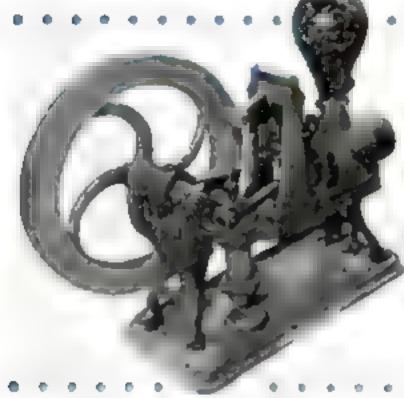
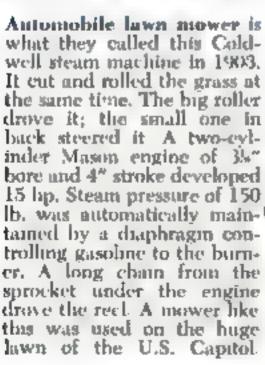


photo at left above) is 88" in diameter and 11" wide. Drive wheels are 64" in diameter and 24" wide, driven at 18-to-1 ratio to put the machine on the road under its own power. The front wheels are steered by a worm-gear and chain linkage. Working steam pressure is 180 lh, per square meh.



From the gaslight era. This Crown pumping engine ran on illuminating gas, Two eccentrics worked separate valves, one to admit gas, the other opening before a small pilot flame outside the cylinder. Sucked in, this ignited the charge while the piston still traveled outward As the gases cooled, a partial vacuum was created and atmospheric pressure drove the piston in. The pump (below the con rod) was worked by a bell crank. Air in the dome on top smoothed out pump pulsations.





Engine 44 rounds the bend (right) with Willock in the cab. Built as a saddle tank 0-4 0 by the H. K. Porter Co. in 1903, this 2'-gauge locomotive worked for years in a steel null. Willock rebuilt it in 1945, adding pilot wheels, steam brakes, a new cab, and a tender he built himself. The cylinders, 8" bore and 14" stroke, have slide valves worked by Stephenson link motion. No midget, the boder has 66 tubes 7' long and 6 sq. ft. of fire-grate area. Working steam pressure is 140 lb.



They're Old ... But They Run

Antique engines stop rusting, start chugging in this expert's hands.

O'l' on Long Island there is a man who likes to make old machinery tick again. Even a 12-ton traction engine is not too big for William W. Willock Jr. of Svosset. He has two steam locomotives weighing eight and 10 tons, plus track to run them on

Among his other machines are a 2½ tonbaby steam roller, two hot-air engines, various smaller power plants and a dozen antique cars gas, steam and electric

Restoring these old-timers is strictly a hobby. Willock, a skilled machinist does most of the work hunself with occasional help from an interested friend. Eventually he hopes to put everything he has in working order. It looks like a lifetime job, END





Rubber Bushings Give an Old Car a New-Car Ride

IF your ear has direct-acting shock absorbers, chances are that long before the shocks wear out, the little rubber bushings that keep them from rattling on their mounting brackets wear thin.

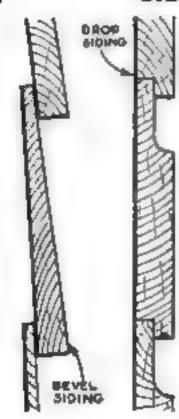
For \$1.60 and an hour's time you can restore your car's ride by cushioning the shock-absorber mounts with new rubber bushings. Sixteen bushings at a dime a piece make a complete set. The difference is well worth the time and expense involved.

Installation of the bushings is a simple



job. On most cars, one wrench will do it. Two types are common; a tapered bushing, which fits into an eye at the end of the shock absorber and a collar type with parallel sides, which fits over a stud on the shocks. To install either type, back off the nut that holds the metal retainers over the bushings, remove the old ones and ship the new ones over the stud. If a torque wrench is available, tighten the nuts to about 25 foot-pounds' torque. Check the shocks, too, while you have them off.

SIDING

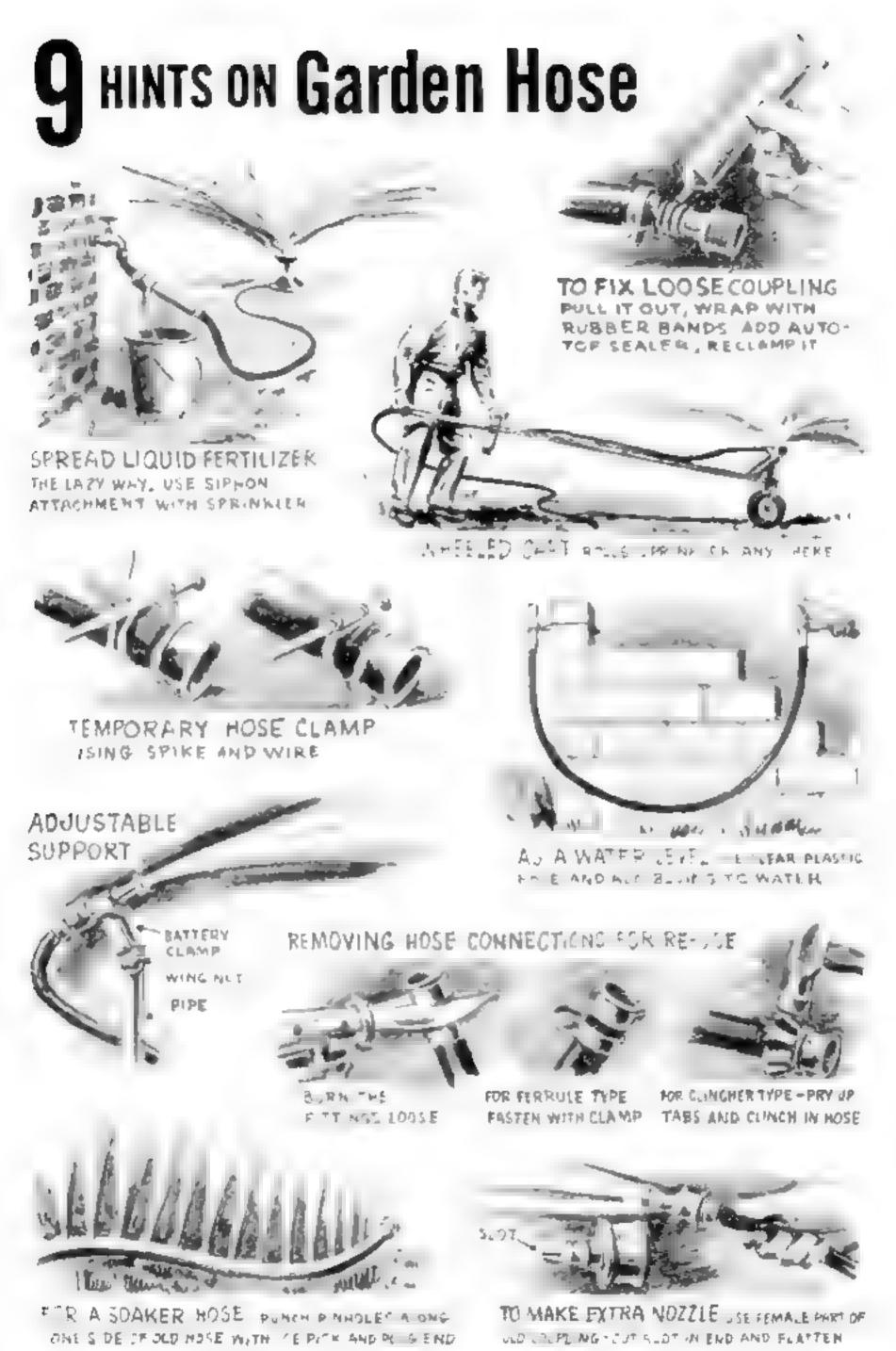


There are two principal types of siding-bevel and drop. Drop. siding is also known as rustic or barn siding. Drop usually is 5", 6", or 8" nominal width and is dressed to \$" thickness. Bevel nding may be either the narrow type, with 3%", 44" or 5%" face widths and a thickness of 7/16" or \$"; or the wide type, 74", 94", or 114" wide and 7/16", 9/16", or 11/16" thick

Bevel siding normally is lapped \$" with the 3" width, 1" with the 6" width, and 1%" in the greater widths. The lap with drop siding is from X" to X", depending on the pattern. The lap, combined with the difference between the actual and nominal dimensions, makes it necessary to use from 123 to 145 surface feet of bevel siding and from 114 to 128 surface feet of drop siding for every 100 square feet to be covered. The amount needed depends on the width-wider siding goes farther.

Beyel siding normally is made in select grades of white pine, ponderosa pine, spruce, western red cedar, cypress, or redwood. In addition to these woods, drop siding is sometimes made in select and in sound, tight-knotted grades of southern yellow pine, Douglas fir, and hemlock.

FOR YOUR POPULAR SCIENCE MONTHLY INFORMATION FILE



JULY 1954 [63



Beans Climb Sunflower Stalks

For four years I have saved myself the job of cutting and setting up stakes in my pole-bean patch. About 10 days before planting the beans, I put in sunflower seeds. As soon as these sprout, I hasten to plant the beans.

The sunflowers grow in a hurry, while the beans take their time winding around the flower stalks. This yields two crops, for the sunflower seeds make good feed to give the chickens during the winter.—John Krill, North Lima, Olao



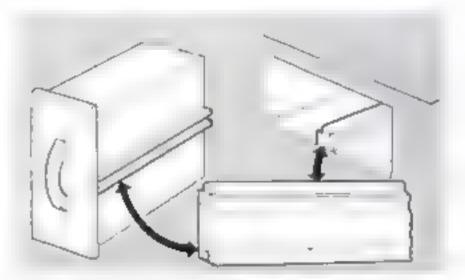
Spool Holds Extension Cord

BOLT two 6"-diameter hardboard disks to a metal 3" double-outlet box and wind a long extension wire on it when not in use. Cut down a tin can of suitable diameter, to fit over the disks and keep the wire neatly wound.—John M. Avery, Dexter, N. Y.



Spring Saves Wear on Bearings

Most table-saw motors are mounted on a hinged base so that the weight of the motor keeps the V belt tight when the saw arbor is raised or lowered. Install a spring between the motor and the saw table to share the weight with the V belt and relieve the armature-shaft bearings of some of the burden. The spring should not support enough of the motor's weight to make the V belt slip—just enough of the weight to lighten the side load on the bearings.—Glen F Stillwell, Manhattan Beach, Calif



Drawer Gets Tongue and Groove

A PIECE of tongue-and-groove hardwood flooring, ripped lengthwise, provides two matched parts for a drawer guide. Nail the parts in place as shown and sand off the tongue to an easy sliding fit.—Norm Jacky, Fond du Lac, Wis.



Henry Struck's hobby is flying model planes, but it takes a lot of groundwork in his shop before they can take off.

By Herbert O. Johansen

IT TAKES two workshops to enable Henry Struck 35 year-old aviation enthusiast of Hamburg Conn. to include in his main hobby of flying powered model planes. There is a "brawn' shop which includes power tools, and a "braun" shop, in which he designs the models and binlids eard-board mock-ups of new, experimental types.

These twin shops are the birthplaces of Struck's prize-wiraing radio-

controlled airplanes. The brawn shop has crowded his one car out of his two-car garage. But before the tools begin to buzz there, he spends many hours at his drawing board in his "brain" shop.

If the board is sometimes thumbtacked with plans for a desk, chair or cabmet, that

is to appease Mrs. Struck

The Struck workshop is far from fancy, but it has the basic power tools he needs to "chop up wood, cut it to the right shapes and drill holes in it." It's a growing shop, though. Struck now has a 10" tilting-arbor circular saw, a 12" bandsaw, a 14" drill press, a 25" belt sander, electric hand drills, a bench grinder, and an air compressor for spray-painting

As yet he has no lathe. One reason is that the shaping of delicate balsa-wood parts for model planes is razor-blade craftsmanship. In fact, Struck could build his models without power tools, but they enable

This is the third of a series of articles about outstanding home workshops, from which everyone who has a shop may pick up a few helpful pointers

See Popular Science Monthly next issue for a story on another fellow's shop.

him to do it more quickly and easily, giving him more outdoor flying time. It's important, too, for him to have the right piece of balsa wood for each part of a plane. Buying small pieces and then discarding them if they aren't quite right is costly. With power saws he can buy the wood in large blocks and chop them up until he gets just the right piece.

Struck's workshopping and plane flying have to be squeezed into nights, Sundays and holidays because he works six days a week for the Chalker Manufacturing Co., in nearby Choton, as an engineer-designer on precision sheet-metal fabrication. He has had no formal engineering training. "Drawing and working with tools just came

naturally to me," he says.

It all started with a fret saw that a friend of his family gave him when he was

about eight years old.

"To get some fun out of it," Struck recalls, "I learned to do delicate, almost embroidery-like woodwork. I would soak the Keeping pace with the progress of aviation, Struck designs and engineers new types in his "brain" workshop. Below, he is shown holding a cardboard mock-up of the air intake and fuselage of a jet-type plane. Rotors and engine that will turn them are on the table.



A drafting machine, shown in use above, is an important brain-power tool to designing planes and the occasional piece of furniture that keeps Mrs. Struck happy with his hobby. Above the cleanup brush is a swept-wing job that is powered by a miniature rocket engine.

Flying the model planes is Struck's real hobby and the reason for his build-them workshop. His Hamburg, Conn., home has plenty of water around for the take-offs and landings of his favorites—seaplanes, like the Seacat he is shown launching. A radio-controlled prize winner, it is

44" long and has a wing span of 68". This model once made an international flight across the Detroit River, from Detroit, Mich, to Windsor, Canada, carrying air-mail letters. It has survived several "forced" landings that sent it back to the shop for major overhauls.



Stepping into his garage workshop, Struck changes clothes and jobs from a design engineer to a plane-building craftsman. Here he is shown measuring a piece of balsa wood to replace a damaged longeron on a plane that has been emplied in an emergency landing.

Building a host is simplified by an ingenious rig Struck devised so that the framework can be tilted to confortable work angles. The fift rig is a 14-long by 15-square plywood boy to which aprights are nailed, supporting the stations, or ribs, of the boat during construction Winding the rubber-band power plant of this super-light plane could be tedious work. Struck does it the easy way, using the gear unit of an old clock. On the bench is a flying-boat model without its wings and a Struck-designed voltmeter with self-winding reels.



Cabin-type model files over a desk designed and built by Struck. The plane, weighing I 10 of an ounce, is fiving at about three miles an hour, powered by a single-loop rubber band. It set a record some years ago by staying in the air for 16 minutes, five seconds.

paper off cigar boxes and cut out parts for locomotives, cars and a lot of other stuff. Most of it came out of Populan Science Monthly. When I got pretty good, I tried my hand at making unpowered model planes and gliders."

Then came the Lindbergh influence, and at the age of 12, Struck built his first rubber-band-powered pusher plane from plans that appeared in the July, 1928, issue of POPULAR SCIENCE MONTHLY. When that plane took off and flew, he was a confirmed model-plane builder and flier. He had a bureau workbench in one corner of his room, and he built six- and seven-foot models there.

Since that time, Struck figures he has built and flown at least 1,000 model planes, from tiny models weighing 1/10 of an ounce to the 54-ounce radio-controlled Seacat shown on page 167. He has won dozens of trophies at model-plane meets.

Hobby Led to Air Force Research

In 1940, his hobby led to a job with Ludington-Griswold, an aeronautical research group that had a small wind tunnel at Saybrook, Conn. It was a temporary job, building free-flight plane models and model wing sections to be tested in the tunnel.

He stayed nine years, doing a lot of secret work for the Army Air Forces.

The move to Connecticut was responsible for switching Struck's main interest from land models to seaplanes. Hamburg (population 265) is near the mouth of the Connecticut River on Long Island Sound, and there is more water around than open, level ground.

For newcomers to his hobby, Struck has some words of advice based on 26 years of experience with model planes.

"One trouble," he says, "is that beginners want to start too fancy. Simple, rubber-band-powered models are fun to build and fly. Your mistakes are mexpensive and will teach you to build them strong so that they can crash and still fly again. In that way you learn how they behave in the air and how to make adjustments. When you have mastered the building and flying of these types, you are ready to go on to gasoline-powered, radio-controlled jobs."

Struck, keeping up with the progress of aviation, has built and flown a swept-wing, rocket-powered plane, and is working on a ducted-fan jet-type model.

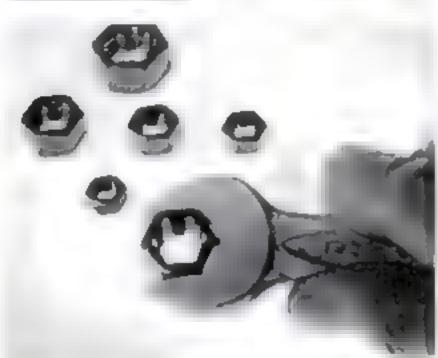
New Hacksaw Has Ty

New Tools X

1. Hacksaw Has Two Blades. This double hacksaw has a coarse blade on one side and a fine one on the other so you can switch quickly from job to job without stopping to change blades. Because both blades are tightened against each other by a single adjustment, the saw is also said to provide greater tension than an ordinary one-sided hacksaw, making possible smoother cuts without blade twisting. Extra blades are stored in the hollow center tube.

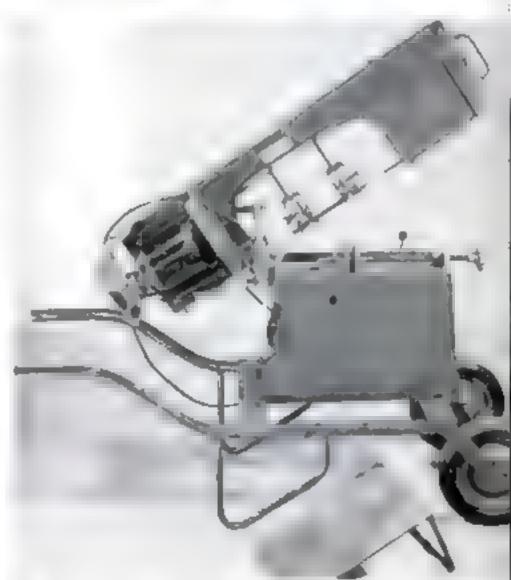


2. Casters Fit Shop
Tools. A touch of the
toe moves these easters
into place for easy
rolling of heavy tools
around a shop. Tilting
the pedal the other way
retracts the easters for
stationary use, The new
casters can be easily
attached to any standard power-tool stand



3. "Nuts" Restore Threads. These rethreading dies in the form of nuts make it easy to restore studs and bolts with any box or open-end wrench. The dies do not cut new threads, but simply restore damaged or rusted ones, so the original nut can be replaced without causing a sloppy fit. They come in eight sizes from X" to X" and in both USS and SAE threads.

Further information on the tools shown on this page can be obtained from. L. Dreses Brothers, Inc. 3512 Lake Park Acc., this ago 37 III ; 2. Rockwell Vig. (a. 400 North Lexington Acc. Patisburgh 8, Pa., 3, Jam Mig. Co. 341) University Rending. Pa.; 4. McCurty Machineer Sales, Barfield, Fig.; 5 Rin k-Mcliman, Inc., 10 Hadron St., New York 13, NY.



4. Bandsaw Rolls to Work. Mounted on a wheeled cart, this metal-cutting bandsaw can be easily rolled like a wheelbarrow from one construction job to another. The tilting carriage moves both up and down and sideways, and adjustable blade guides permit angle cuts up to 45°. It has a X-horse motor and a throat capacity of 9".

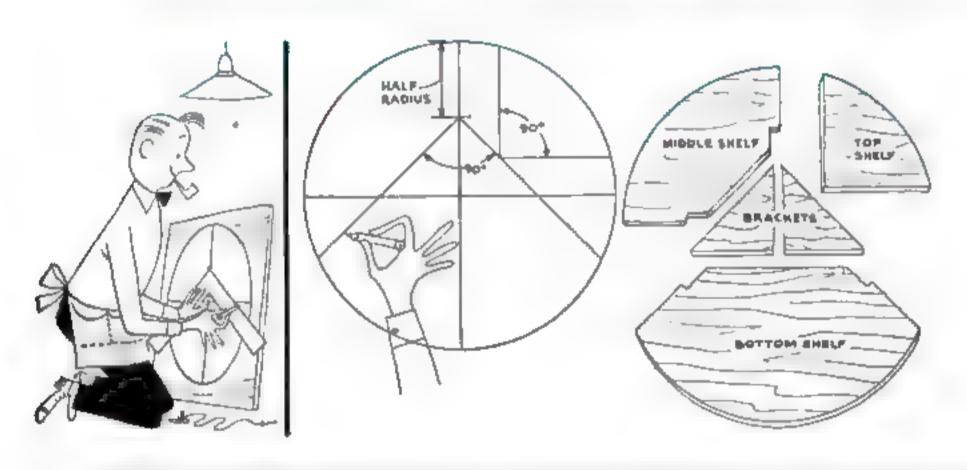
S. Plastic Drill Case Won't Break. You can drop this drill set on your workshop floor or bang it around in a toolbox without danger of breaking the tough, flexible-plastic case, It holds 13 high-speed drills in sizes from 1/16" to X".

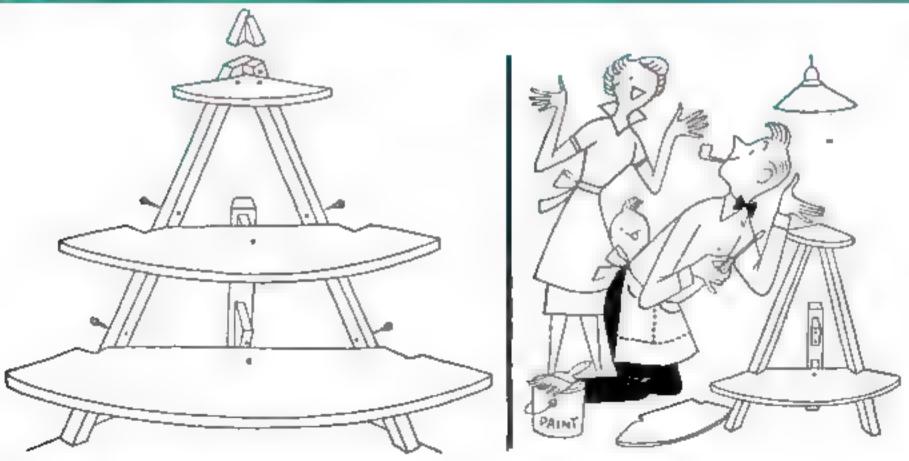


By Roy Doty and Warrant Pryor

Wordless Workshop

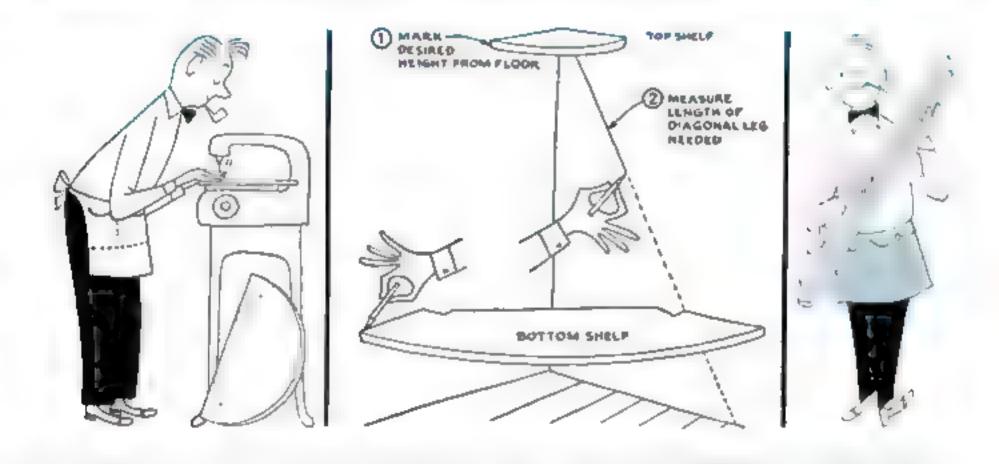


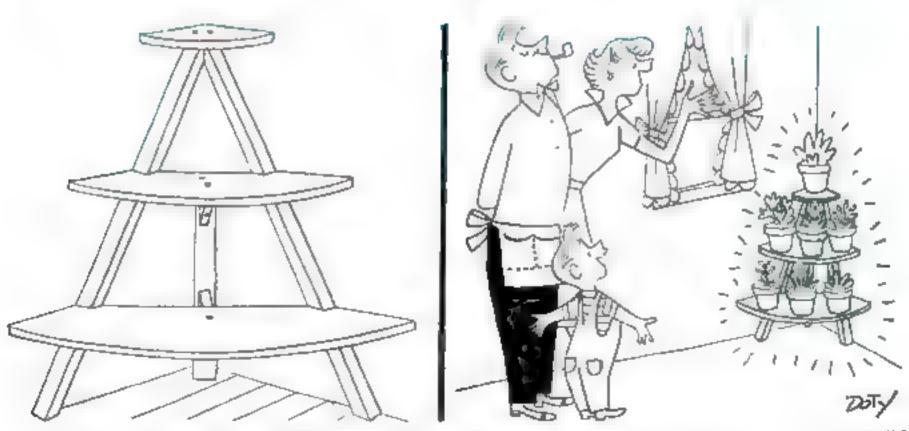




170 POPULAR SCIENCE



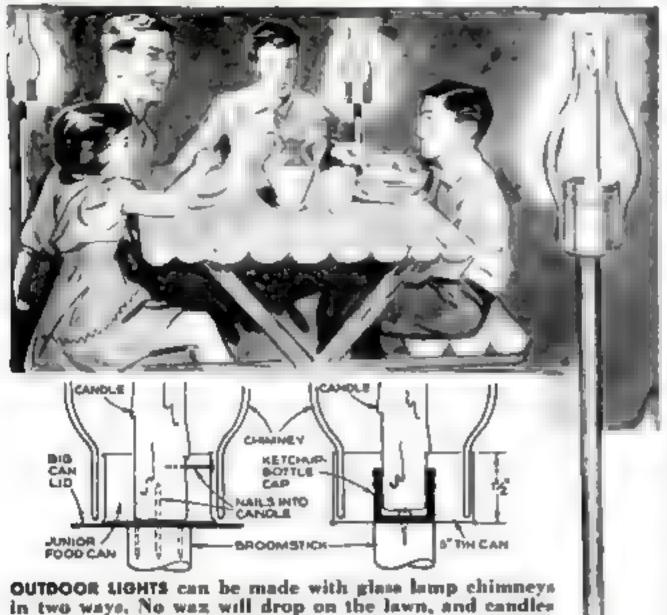




Next Month: A tripod brace to safeguard your camera.

JULY 1954 **[**]]

How to Enjoy Outdoor Evenings This Summer by Candlelight



stay lit in wind. Sharpen posts to push into the ground.

LENGTHEN the evenings for back yard gettogethers with candlelight. Lamp chimneys, costing only pennies each, can be mounted on broomstick posts to make yard lights

One way is to nail a "iunior-food" can on with a bigger can lid between. This forms a ledge for the chimney, which fits around the can, Two nails, one through the can side. hold the candle. A second method is to cut a vegetable can to 1%" in height and screw it to the post with a bottle cap inside. The chimney fits into the can, and the cap holds the candle. Thick candles are most economical.



Skate-Wheel Idler Takes Up the Slack in a Loose V Belt

CHANGING the speed of a V belt on fixed step pulleys is made easy with this spring-loaded idler that takes up slack of a loose-fitting belt when the machine is running.

Mount the roller-skate wheel between two 6" lengths of %"-by-%" strap iron and squeeze the middle of the straps against a 1" length of brass tubing to space them evenly apart. Slip a spring from a strong rattrap over a 1%" length of %"-inside-diameter tubing and insert the tubing ends in 9/32" holes drilled in the bottom of the iron straps. Peen the ends of the tubing

over the straps to hold it in place. Assemble the idler on a base of two angle irons with 3" lengths of %" rod threaded at both ends. Lock the rods on the angle with two nuts, tightened against each other, on each threaded end of the rods.

Mount the idler on the bench or machine so that the straps lean 45° in the direction of belt travel when it is taking up the slack. Raising the arms to the top of their swing frees the belt for changing steps. The arms slide on pivot rod and move sideways with the belt.—I. M. Finn, Pittstown, N. I.

EMEMBER when the Fourth was a day

REMEMBER when the Fourth was a day of cannon crackers, skyrockets, pin-wheels and roman candles? Fun, weren't they? But what marred those good old days was the salute that went off in a child's hand, the fizzler that let go when somebody looked at the fuse, the roman candle that backfired, the skyrocket that landed on a shingle roof

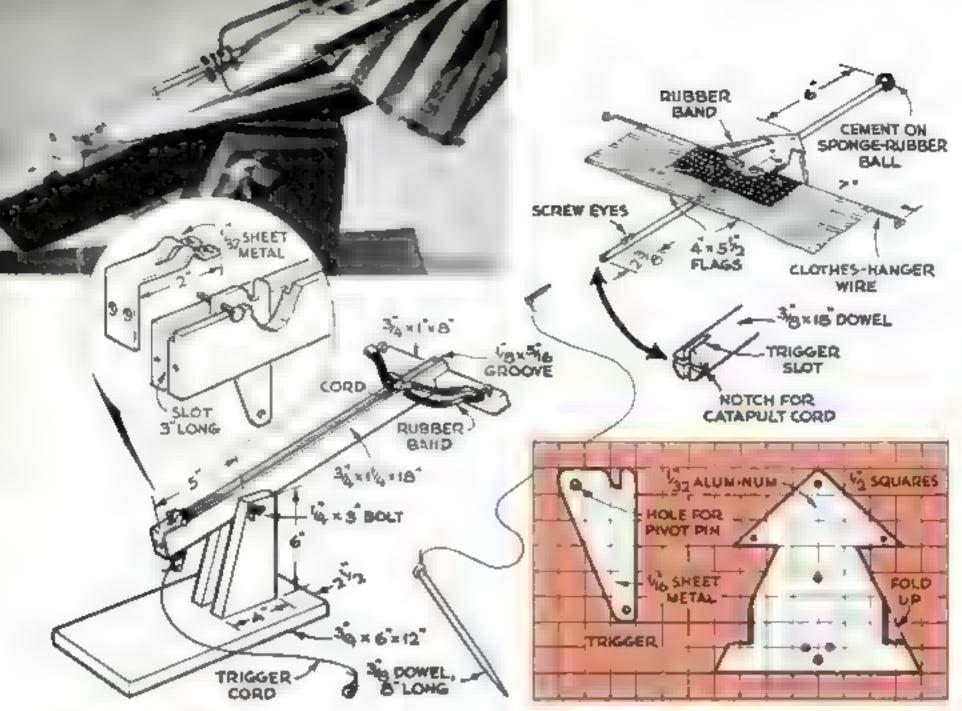
Today, 27 states and many cities limit the use of fireworks. Deaths and injuries from July Fourth mishaps are down. You can see beautiful fireworks displays at public celebrations and amusement parks i hat's the place for them

But you can still give the youngsters hand in celebrating the Fourth with noise and action. Paper caps are still legal in most states, and if used in properly lesigned theories' issues and action.

Can Be Safe

Here are seven quickly made toys that will give youngsters a happy celebration this year.



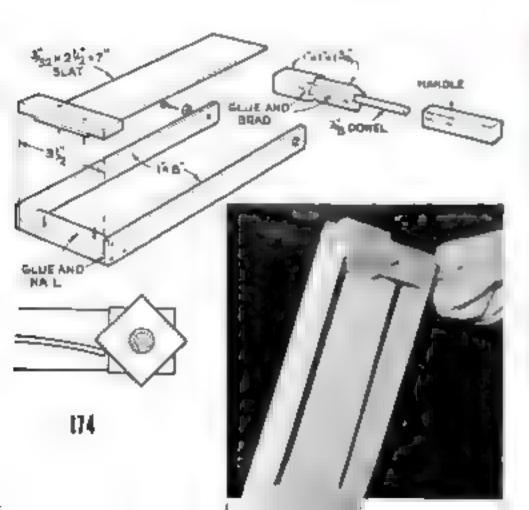


ROCKET FLAG

HERE's real action with a burst of red, white and blue at the peak. The launching rack, a grooved piece, is mounted between the uprights by a bolt and wing nut. Two heavy rubber bands through screw eves in the crosspiece are joined by a bit of strong fishing line

Two coat-hanger arms pivot on small bolts fastened with nuts to the arrow-shaped plate screwed to the rocket. Rubber bands pull both arms outward. In setting up the

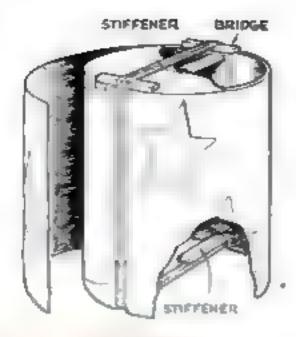
rocket for firing, the flag arms are folded back with their looped ends between the two screw eves on the dowel, and are held in by a nail or small pin, which is tied to a stake or to the front of the base. The trigger slips up into the long notch at the end of the rocket, and the cord joining the catapult elastics is slipped over the shallow horizontal neck and when tight it will lie within the trigger notch. Pulling the lanyard tied to the bottom of the trigger fires the rocket. A sponge-rubber ball should be securely cemented to the front.



SWING RATTLE

Trus familiar slat-and-sprocket noisemaker is made largely from a cream-cheese box. The box sides serve as the sidepieces in the toy, and the ends are nailed together with the slat, cut from the bottom of the cheese box, between them.

The sprocket is made from 1" square hardwood, two pieces being glued on a piece of dowel at a displacement of 45°. The dowel is slipped through a hole in one side, and the other end of the sprocket is retained with a washer and wood screw. Since tooth depth is limited, the slat should enter as far as possible.



BOX O' CRACKERS

THE brittle chatter of "lady crackers" is punctuated in this noisemaker with a cannon-cracker bang. Cut an 8" length of 5" or 6" shipping tube and cement on a head of tough manila paper. Glue in wooden stiffeners at bottom and top. Moisten paper head so it will tighten on drying. Stretch half a dozen thin rubber bands around tube, and one heavy one. Pluck thin bands for the rattle of crackers, the big one for the bang.



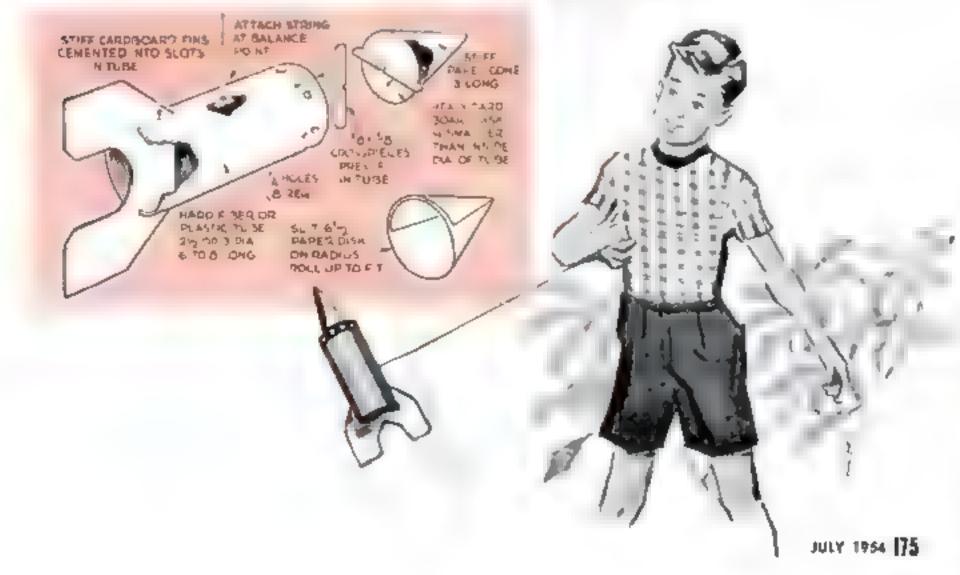
Within this whistle around at the end of a 5' string and it will how like a banshee. A fiber or plastic tube is best for the body, although a stout mailing tube might do.

Roll the cone from a disk of heavy paper, overlapped to the proper diameter. Make at K" smaller than the tube, and cement it

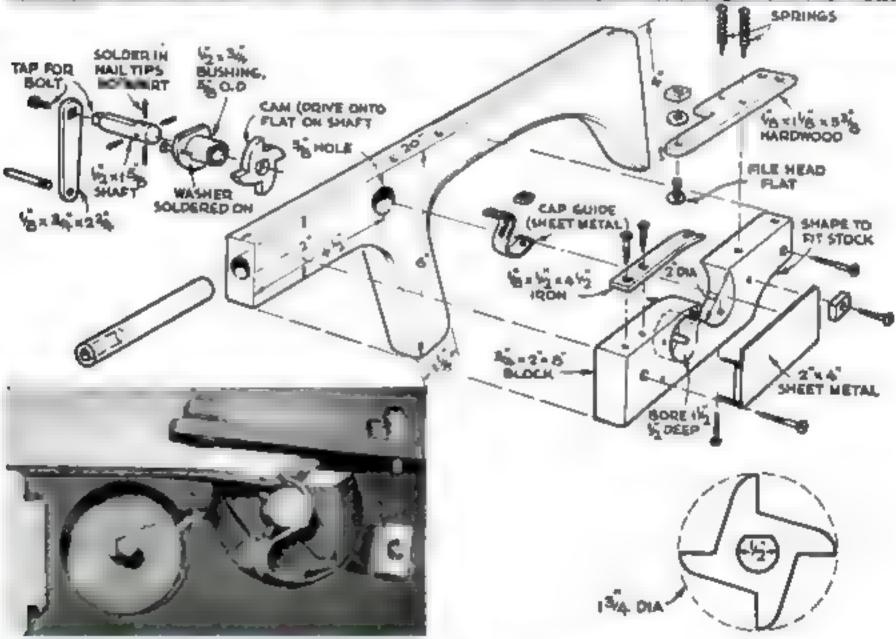


to a cardboard disk of the same diameter. Cross-lap two sticks as shown, letting them project to form a tight fit in the end of the tube. Slide the tail into slots cut in the opposite end of the tube.

The location of the cone is critical if you want a good whistle, and some experimentation may be needed to produce just the sound you want.







CAP-FIRING MACHINE GUN

This fast-shooting piece uses rolls of perforated caps. The holes, spaced one cap apart, run over pins in the camshaft and so are positively advanced. Make sure of your cap supply first, for not all dealers stock them.

Saw the frame to shape and drill a X" hole for the bushing in which the camshaft turns. Solder a large washer to the bushing so that it can be screwed to the right-hand

side of the gun. Shape the breechblock and glue and screw it in place. The camshaft is filed from %" rod or a %" bolt. File a flat for the cam hole, file the cam to a tight fit, and drive it on. Drill crosswise holes through the shaft and solder in four nail ends projecting 3/32".

The cam lifts a hammer made of %" hardwood and loaded by two springs. It is attached by two screws left loose. A bolt at the end strikes a steel firing plate.

THE RAUCOUS CAN

It's simple, but this can makes a nerveshattering racket, surely enough to satisfy any youngster.

Cut the top out of a No. 2 tin can. Punch a small hole in the center of the bottom. Tie a knot at the end of a 4' length of string and pull the other end through the hole. Rub rosm all along the string.

Once the string is well coated, simply pulling the fingers along the string brings forth the decibels. The day's efforts may prove rough on young fingers, which can be protected by pads of adhesive tape.

DAYLIGHT SKYROCKET

Trus real fireworks piece will be safe in the hands of any youngster who can be trusted with matches, and who can handle the cartridge and fuse needed

It makes use of a harmless model airplane jet motor, which can be refueled and shot again and again. Since it trails no sparks, the rocket affords no fire huzard, but it should be made in bright colors and fired in daylight. Keep the weight down and trim the stick so that it balances on a line with the orifice of the jet engine, END

OR BALSA

48 LONG

WOTOR CLIP TH CAN

1 - 3 COLORFO

MAPER TUBE

NOSE

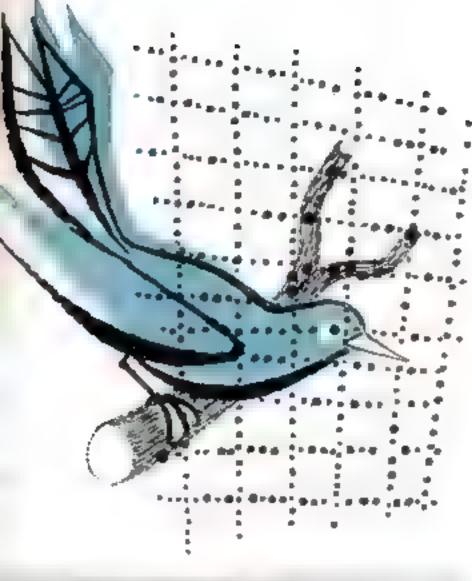
LONE

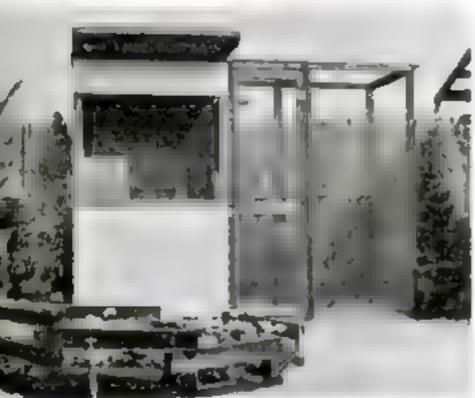
DOLL UP PAPER

TO BE CEMENT NS DE TO RECEIVE STICK

> BEND DOWN AND COMP. NTO WOOD







SHELTERED ENCLOSURE of the small aviary above makes it suitable for use the year round in a fairly cold climate. A two-by-four fence in the foreground protects plants.

OUTDOOR LIVING AREA is combined with this California aviary designed by Ray Coates of Hayward, Calif. Overhang offers comforting shade both for birds and people.



An Aviary Can

Here are four types to choose from. Netting and wood scraps are what you need to build 'em.

By Jerry Parker

IF YOU raise birds—canaries, parakeets or what have you—why not move them outdoors for the summer? You can do it by building an aviary, a large outdoor cage that gives them space to spread their wings. Carefully placed and built, the aviary will be the show spot of your yard or garden.

The photographs on this and the facing page show four aviaries designed for use in California, where the birds usually can remain outdoors the year round. You may not want to build an aviary this elaborate, but the examples suggest what it is possible to do.

Any aviary must safeguard the birds from predatory rodents and animals. The experts suggest that the best way is to carry the screening down about 18" into the ground. Use aviary netting (which resembles chicken wire with smaller openings) or %" or %" wire mesh.

Frame the structure with two-by-threes, two-by-fours or even one-by-two furring strips. Studs can be spaced to suit the width of the screening you use. Aviary netting comes in widths of 2, 3, 4 and 6'.

Every aviary should have a roofed and sheltered corner for the birds, or, in cold climates, a small house with a window or two for ventilation. The windows should be covered, on the side where they don't open, with wire netting.

Plain or Fancy-the Birds Don't Care

Inexpensive materials will do to enclose the corner. Sheets of corrugated aluminum make a durable roof and asbestos-cement panels "" thick create walls that require no upkeep.

If you want to make your aviary fancy, with bamboo trim and maybe even a cupola on top, go ahead—the birds won't mind. It won't impress them but if it makes you happy that counts a lot. Both you and the birds will have to live with your aviary.

POPULAR SCIENCE

Be a Garden Show Spot

A concrete floor can be hosed clean in a pffy—but it is not essential. Concrete footings and a dirt or sand floor will do well enough.

Birds will spend most of their time in the open part of their aviaty, an area called the flight. This must be screened on top to keep out cats, natch—and should be about as big as the owner can make it. This doesn't mean it has to sprawl all over the lot. A Honolulu aviary 7' high, 7' wide and 10' long is home for 200 finches. That should provide plenty of space for your brood

In general, it is best to make the flight long and narrow to give the birds more room to fly. It should be high enough, 7 or 8', so the birds can soar over the keeper's head with plenty of clearance when he enters the aviary.

A safety entrance is also a good idea. This consists of two doors, one in a screened cubicle either inside or outside the aviary. This keeps birds from escaping when you cuter

A water supply is essential. A line run right to the avtary is best, perhaps to a drip waterer such as used by poultrymen

An aviary made of redwood, or one of the other outdoor woods such as cedar or locust, requires no finish to guard it from the weather. If the aviary has to be painted, green is considered the best color. A lighter line of blue green or vellow is recommended for the interior.

A LONG FLIGHT AREA lets the birds stretch their wings, but an untdoor effect, the avery pictured at the right was built around growing trees, and branches were put inside to provide perches.

LARGE BOXED CAGES are the main feature of the Oakland aviory below, frankly intended as a garden showpace by Jack Lathin, landscape architect. A lattice roof of bamboo ties the two together.







Homemade Rake Cleans Camp

If you like to keep camp grounds neat but can't take along a regular rake, you can improvise one this way. Drive large nails about 2" apart into a narrow board. A forked stick makes the handle, nailed on as shown.—V. H. Lamoy, Upper Jay, N. Y.



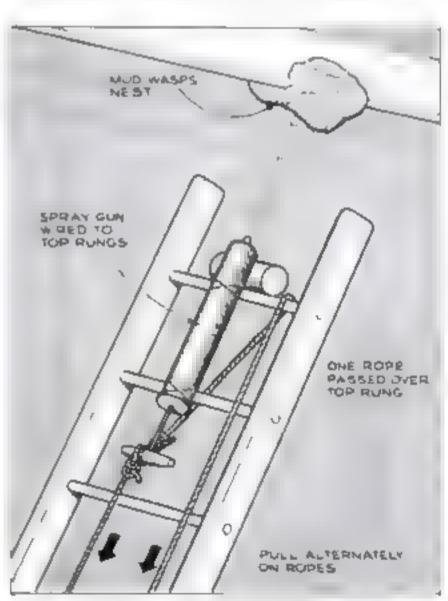
Tripod Holds Camping Light

A CAMERA tripod makes a safe, steady stand to hold a lantern off the ground during camping trips. Hooked over the panhead handle, the lantern can be set at any height and moved quickly around the camp site.—Shep Shepherd, Culver City, Calif.



Insulation Saves Books, Photos

ALUMINUM reflective insulation makes an attractive cover for books (left, above) that lasts for years and helps keep out heat and moisture. Envelopes made from the same material, turned shiny side in (right, above), will protect photos and valuable papers. The insulation cuts easily with seissors and can be fastened together with cellulose tape or cement.—Ken Murray, Colon, Mich.



Remote-Control Gun Kills Bugs

Wire a spray gun between the two top rungs of a ladder like this, with one rope leading directly to the handle and the other passed over the top rung. Alternate tugs on the two ropes will then spray a wasp nest with DDT. It works, I've tried it.—Manfred A. Carter, Hampden, Maine.



Cuts clean, accurate designs in wood (up to 1" thick), light metals and plastic. Wizard 12" jig saw has full 1" stroke; trouble-free, oil bath Scotch yoke drive. Sturdy 1-piece cast from frame. 91/4" square cast from table tilts 45° to right, 25° to left. Enclosed sawdust blower. pures\$19.75



5-piece ignition wrench set is ideal for doing work on your car's electrical system, lighting, radios and household appliances. Includes three wrenches with a variety of openings, double-cut file and feeler gauge. Made of case hardened, stamped steel, cadmium plated. (wexas) 374



Gives a "piano" finish to rough wood, metal surfaces. Speedway Speedsander ends tiresome hand sanding, polishing. Powerful direct drive ball-bearing motor. "Natural" orbital motion—3450 times a minute! Uses any sheet abrasive. Lightweight aluminum housing.

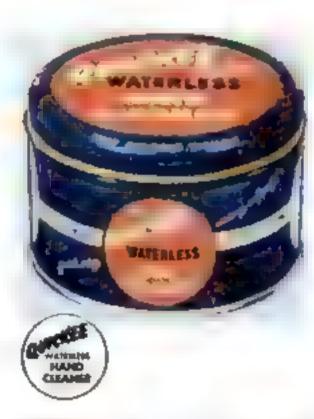


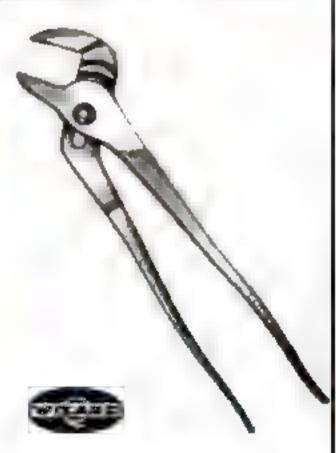
America's Finest "Do it Yourself" Tools...Yours at Western Auto

Choose from over 1,100 professional quality power and hand tools . . . , see your Western Auto mon this week.



No keys to lose! Simply dial 8 numbers to open this rugged Slaymaker combination lock. Made of laminated steel, with aluminum face and back. Steel riveted. Etched dial. Hardened 1/4" steel shackle has 3/4" clearance. School Board approved for lockers.





Mokes tough turning jobs easy. Wizard "Circle-Grip" plier's deep milled channels give 5 easier, positive adjustments. Jaws always parallel for wrench-like action on nuts, bolts, fittings. Long knuried handles give extra leverage for powerful, non-slip grip. Chrome-plated alloy steel. (1912)......\$2.65



The new way to set

Ceramic Tile

New adhesives make tiling a do-it-yourself job for anyone, as even crusty old pros take to the stuff in place of traditional mortar.

By Paul Corey and Darrell Huff

FOR solidity, beauty and permanence, it's hard to beat ceramic tile. It gives a sleek job that lasts just about forever.

That has always been true. What is new is the easy way it is now possible to set tile by using adhesive instead of mortar. The new adhesives make the tile work a tob that any householder can do himself

There is one gimmick, however. If your surface is not sound and level you may have to use the traditional mortar method. This is not too difficult when you are tiling a floor or a sink top. The tricky job is using mortar on a wall, Fortunately, most walls can be tiled with adhesive. Even the professionals, in growing numbers, are going over to the stuff

Planning to tile. Be sure to distinguish between floor tile and wall tile when buying. The floor variety is made to stand up under harder use.

Since each tile manufacturer has his own patterns, the way to choose the types you want is from your dealer's samples and literature. But first you'll have to know what area you are going to cover. For a simple job, merely measure the space so that you know how many square feet will be needed and how much trim, if any,

The "self-spacing" kind of tile is much the easiest to install. It has small projections along all edges to insure even joints for grouting.

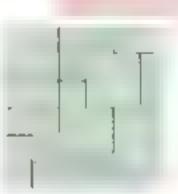
If you want to save a good many dollars, buy seconds,

LIVING AREAS of the house can be brightened with tile, as well as the kitchen and bath. Or play possibilities can be built into a tile floor in a game room, as at the upper left. The living room at the bottom left has a tile floor in a candom pattern and chony tile on the walls in and around the fireplace.

THES VARY widely in pattern und style. Your dealer will help you pick the tile best suited to your job. Be sure to note that tile varies, too, in size and thickness as well as for floor and wall use.













CLOVER-RED WALL TILE sets the dominant color in this kitchen. Notice that a line of tiles carries the contrasting spruce green of the counter top down face of base cabinets.

MODERN BATHROOMS become more colorful with the help of ceramic tiles, beatures that make walls and floor easy to clean are the cove at wall bottom and cap strip at the top.



as these imperfects have all the important qualities of the perfect tile and usually sell for about half the price.

Preparing the surface. Most new surfaces must be sealed before applying tile adhesive. Whether a wall is wood, plaster, or plasterboard, give it a coat of paint primer of thinned shellac. If the wall is already covered with oil paint, it will need no further priming. If there are any cracks, fill them with patching plaster; chip away any soft or broken plaster first. Before tiling around a sink, remove any old linoleum.

Setting the tile. You'll probably use adhesive for any wall job. This method is also suitable for putting tile on smooth floors, and even for sink counters and showers—if you use waterproof adhesive.

With the wall sealed and fixtures removed, choose the most prominent wall for the beginning point. In a tub recess this is the wall running the long way of the tub.

Most modern tile jobs call for straight lines vertically as well as horizontally. For staggered joints, start the second course, and each alternate one, with a half tile.

Grouting is the final step. You buy tile grout in powder form for mixing with water. Use about two parts grout to one of water to form a paste about as thick as pancake batter. Don't mix more than a quart at a time. Let it stand about 20 minutes, then thin it with just a little more water so that you will be able to brush it on. Don't get it so thin that it will run down the wall.

And if you have any grout left over, don't dump it down the sink. It will harden in a trop or drain line as readily as on the wall.

Attaching fixtures. Fixtures to be recessed into a tiled wall are usually available in sizes to match the tile. Just omit one or more tiles (often 1% tiles) and cement the fixture into the opening.

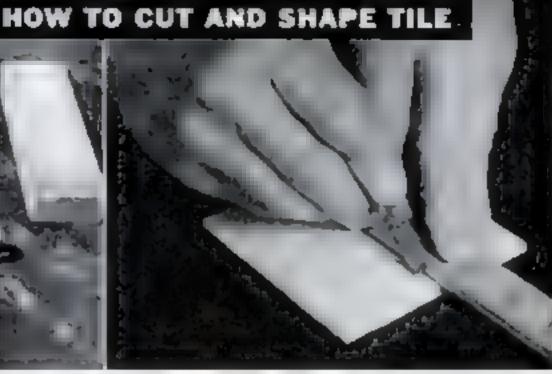
Such items as towel rods constitute a somewhat different problem, with two solutions readily available. One type of fitting must be recessed into the wall. For this you nibble a corner off one piece of tile. Then cement the metal mounting into opening.

Much simpler to install is the surfacemount type, since it does not have to be placed at a time when you're busy on your tiling job. It can go on when you're through laying tile. This variety comes with screws. Simply drill a hole through the tile for each screw, drilling on through into the wall. Then drive in a wooden plug to fill the hole. Fasten the screws into the plugs.

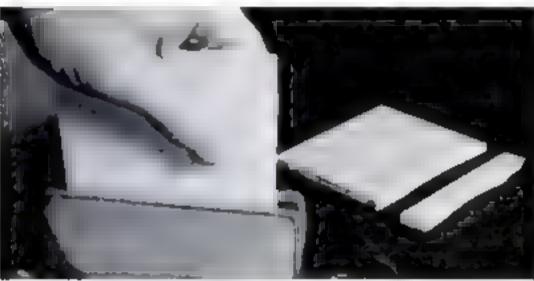
POPULAR SCIENCE



PROFESSIONAL CUTTER, borrowed or rented from a dealer, scores the tile on giazed side when you pull cutting wheel across it. Depressing cutter breaks tile on score line.



ORDINARY GLASS CUTTER will also do it. Score the tile, place it over a nail or triangular file, and break with a blow of your fist. An ice pick will also score the tile.



SREAK THE TILE in a vise if the score line is near the edge. Insert narrow strip in the vise jaws and press the upper piece smartly to the side to get a straight break line.



AFTER CUTTING by any of these methods, cut edges must be smoothed. Use a stone as shown here, or scrape with a file or rasp. Or, if you want, use emery cloth on a wood block.





TO MAKE A HOLE in a ceramic tile, chip away the glaze with light hammer blows on a nail set. Then use a screwdriver to dig a hole through the tile, using a twisting motion.

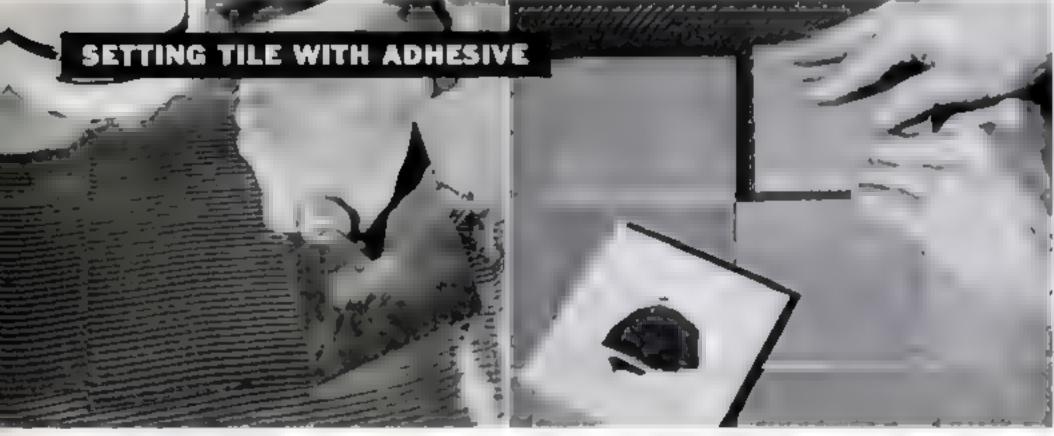


FITTING TILE around prope calls for cutting it in two. Make a half-circle on each edge, nibbling off a little at a time with pliers or nippers. Pipe flange will cover imperfections.



OLD THE can usually be pried off with an old chisel or a screwdriver and hammer. Stubborn tile can be broken by placing a pointed chisel near corner and lapping.

TO REMOVE a single damaged tile, scrape out as much of the grouting between this and adjacent tiles as you can. Then crack the tile by tapping a clusel placed against it. PRY OUT THE BROKEN BITS. Remove as much of the old adhesive as possible. Then put in a replacement as shown in the tile-setting pictures, finisling up by grouting.



PLACE GOS OF ADHESIVE with purity knife and spread it with a notched spreader, holding spreader at a 15 angle. Go over it again if necessary to measure a thin, even coating.

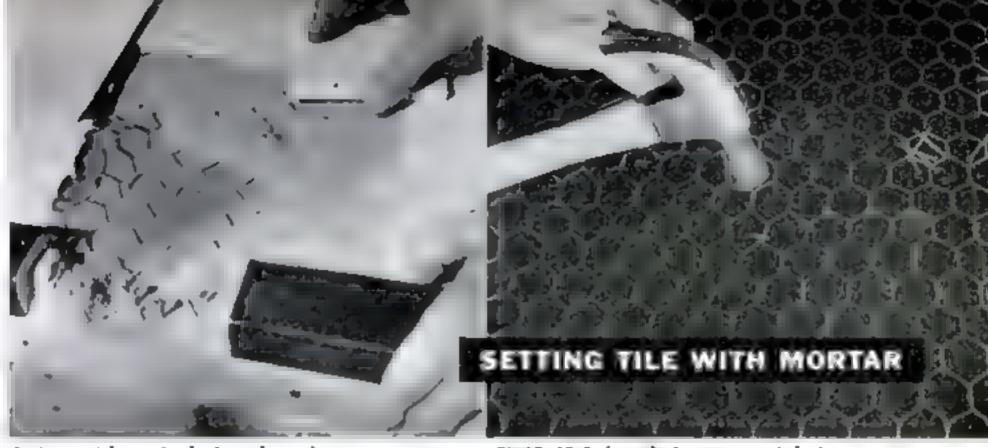
BUTTER A DAS OF ADMESIVE about the size of a half-dollar onto the back of each tile as you set it. Set tile about $\frac{3}{4}$ " away from where it belongs, then lightly slide it into place.

GROUTING may be done at any time after tiles are set. Brush the pasty material on, using a large painthrush for big jobs. Wash off immediately with a water-saturated sponge.

WIPE with soft cloth. When excess grout is removed, point up cracks with your linger until grout lines are smooth and even. Wipe again with a cloth so face of the is clean.

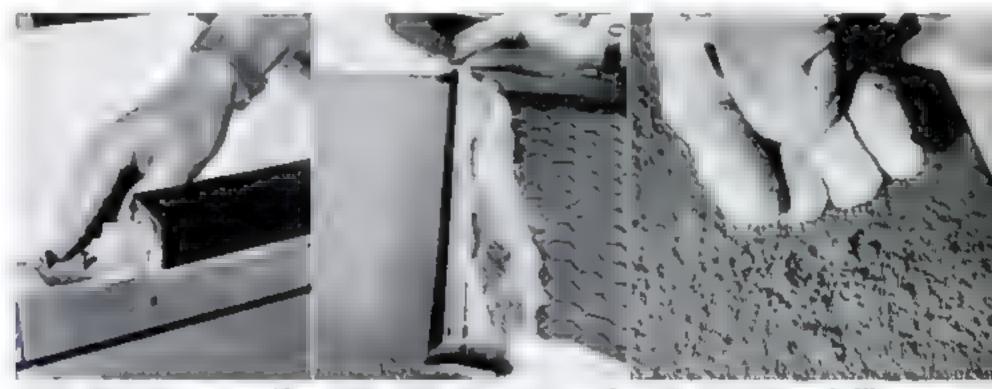
USE only waterproof adhesive if you cover a sink top by adhesive method. Refore placing other tile, set sink cap tile over molding. First, spread adhesive evenly on molding.





CUTAWAY here is designed to show a cross section of tile set in mortae—as for a sink top. The wood base is covered with tar paper; chicken wire forms reinforcement for the mortar.

FIRST STEP in tile-in-mortar job is covering wooden sink top with waterproof building paper. Fasten 1"-mesh chicken wire with galvanized nails every 8" and bend them over.



PLACE SINK CAP, or outside edge, first, as shown above. Staggered row of galvanized nails should stick up ½ " or more. Spread cement mortar. Apply skim-coat cement (portland cement and water mixed to a thick cream) to back of tile and press over mortar.

over suitoing Paper and chicken wire place %" wood strip at edge of sink as guide for thickness of mortar. Place other strips every 4' or less, making them high enough to give at least %" pitch toward the sink. Mix mortar and strike off as shown here.

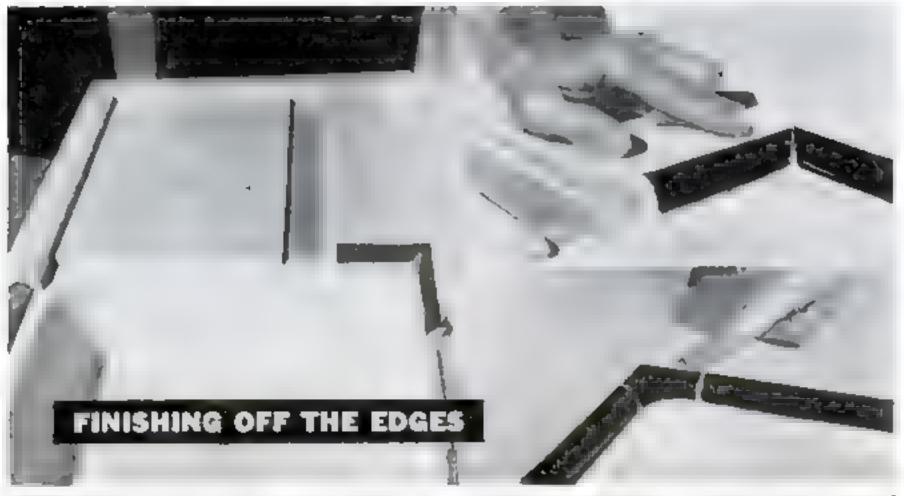
with mortar. If you intend to use quarter-round at edge of sink bowl, the wood strip there may remain until you are ready to place the quarter-round. Now dust a thin layer of dry portland cement over surface of the mortar.

THE SHOULD BE PRESOAKED for one hour and then permitted to drain on a clean board for five minutes before setting. Set tile on top of the prepared mortar bed, starting inside the sink cap and next to the sink, and working down toward the end and rear of the dramboard.

the tiles and press them into the morter. If any tile is too high or too low, remove it and take out or add a little cement. Reset the tile and tap into place. Finish by grouting.

(Please turn the page.)





DEMONSTRATION SINK shows two methods of finishing tile at edge of sink. Method at left uses bullnose tile without trim of any kind. At right side of sink quarter-round tile is used. This is placed after buttering back of tile with pure portland coment paste.

ALTERNATE METHODS of fitting quarter-round at corners are shown here. The upper one calls for matering quarter-round. Dealer will make this cut, or you can do it yourself with a ceinforced cutoff wheel on saw. The other method uses a special corner tile.

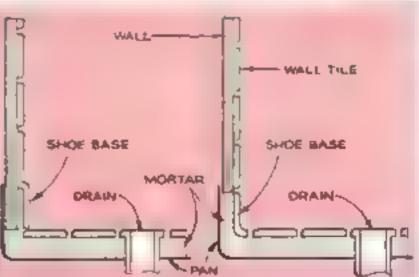
TUB AND SHOWER DETAILS

DEMONSTRATION at right shows how to tile in an old-style bathtoh. Dealer cuts special tile shapes to your paper pattern. As cutaway indicates, tub as framed in, plywood covered. Begular tile is set with juliciase, For tub edge, use murtar or waterproof adhesive.

ITEMS BELOW make tiling your stall shower easy. A shower pan of reinforced waterproof paper goes on the floor. The drain is the same size as standard tile. The sketches at bottom right show two different methods of arranging the tile where wall meets floor.





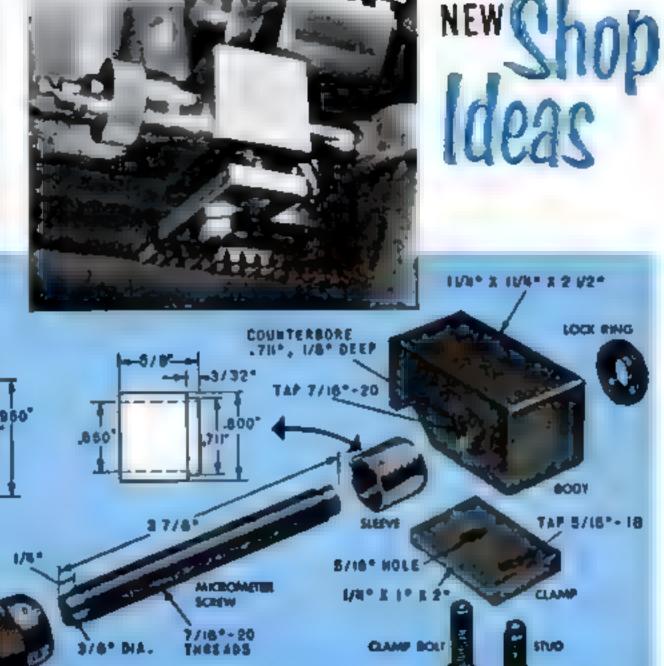


check the location of the carriage-stop pads on your lathe in relation to the ways, and lay out the body accordingly. The short stud at the front of the clamping plate enters a shallow recess in the body. Set it for effective clamping. Then loosen just the bolt to slide the stop into place.

KNURL

7/16 - 20 THD.

NOLE FOR SPANNER



Micrometer Carriage Stop. Rugged and accurate, this device clamps on the lathe ways either side of the carriage to limit its travel for duplicate facing, accurate boring, or milling. With it, I have milled a %" groove around a turret body within .002".

Mill, or saw and file, the V notch to fit your lathe (for flat ways, make the body longer to hook over the inside edge). Drill undersize, bore to .390", and make the .711" counterbore. Start the tap in the tailstock chuck to insure a straight thread.

Cut the screw on the lathe using the tapped hole in the body as a thread gauge. Round off the ends of the screw.

Graduate the sleeve by setting the compound rest parallel to the ways, with a V tool in the post. Scribe the horizontal line first, and then vertical lines .050" apart, gauging them by the compound feed collar.

To graduate the thimble, mount a small 50- or 100-tooth gear on the end of the stock before boring it out. Index by running the tool against the teeth; then feed in to scribe the lines.

The lock nut clamps the thimble to the screw. Drill the nut to fit a small spanner

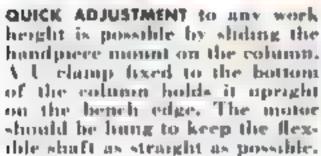
wrench. The knurled lock ring at the other end keeps chips out and locks the screw.

To align the zero marks on the sleeve and thimble, it may be necessary to face off the shoulder of the .711" diameter slightly. I found that with the edge of the thimble at the zero on the sleeve, the thimble read 15. Facing .015" off the sleeve shoulder made the zeros coincide.—Harry L. Edwards, Scranton, Pa.



File as Boring Tool. Having centered a gear in the lathe to fit it to a shaft, I found I had no drill or reamer the right size, nor a boring tool small enough for the job. A triangular file, ground as shown above, met the emergency. Being already hard, it required no heat treating. It worked better than any small boring tool I had ever used. —John B. Underwood, Berkeley, Colif.





Flexible-Shaft Uses. In building a model, I needed both a sensitive drill press to make holes down to No. 80, and a light-duty toolpost grinder. My high-speed flexible shaft doubled for both.

Having an old microscope rack-and-pinion movement, I made a clamp to fit the shaft handpiece and bolted it to the rack member. The entire movement was slid over a %" steel shaft, which happened to fit the lens barrel meely. A wing screw was added to clamp it at any point.

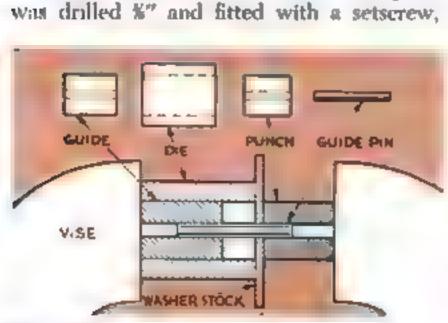
For the table, a small, thick steel plate

making this also adjustable so that the work can be raised if desirable.

Instead of a microscope movement, an old bottle capper would make a good mount. The handpiece will have to be mounted on the side of the plunger. Blocks will raise the work to a suitable height.

For tool-post granding, the handpiece was clamped with a sturdy strap to a "-by-1"by-5" steel bar. This was mounted in the lathe tool post as shown at the right above. The flexible shaft was run off horizontally and its motor laid on the bench.-Andrew Pfeiffer, Old Lume, Conn.

Washers Made in Vise. Odd-sized washers can be punched out quickly with this tool. Make at least the die and the punch of tool steel and harden them. Drill or punch the GUIDE PUNCH GUIDE PIN center holes in the washer stock. Then clamp in a heavy vise as shown so that the guide and the pin, which must be a good sliding fit, line up the parts. Tighten the vise and V.SE a washer will be punched out. Lubricate the guide and pin occasionally.—Arthur R. VASHER STOCK Morgan, Naugatuck, Conn



90 POPULAR SCIENCE

This Modern Smoking Stand Is a Refugee from a Disk Jockey

PARTS for this smoking stand are free. Its top and base are transcription disks, its upright a photostat-paper spool,

Any radio station has old transcription disks waiting to be thrown away. The kingsize spool should be obtainable wherever photostats are made. Be sure to get the

metal end plates with the cylinder.

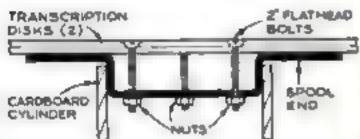
Two 16" platters are used for the top and two 12" ones for the base. Center one on an end plate pulled out of the spool, and mark off on the plate the three holes in the disk. Do the same with the other spool end. Drill all the holes %".

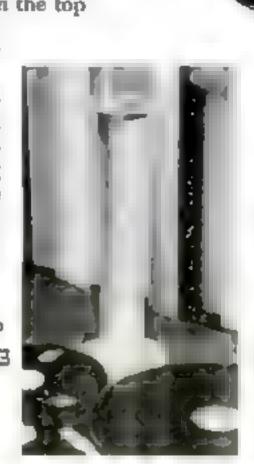
Countersink those in one disk of each pair to take flathead bolts. Then assemble as in the drawing. The bolt heads in the top

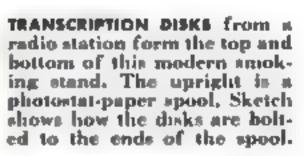
can be painted black, or they can be covered with a disk of felt or

blotting paper.

Shellac the cardboard tube before painting. The lower spool flange, which shows, can be finished to match or in a contrasting color. Push the base plate into the cylinder. Half fill this with sand and press the top into place.-John L. Hoke, Washington, D. C.



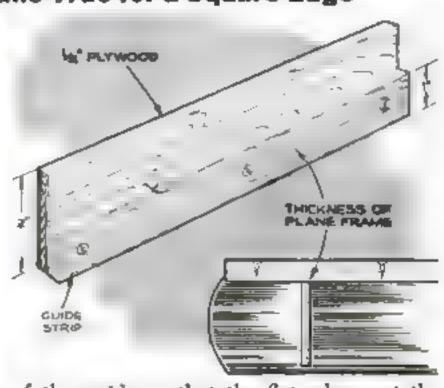




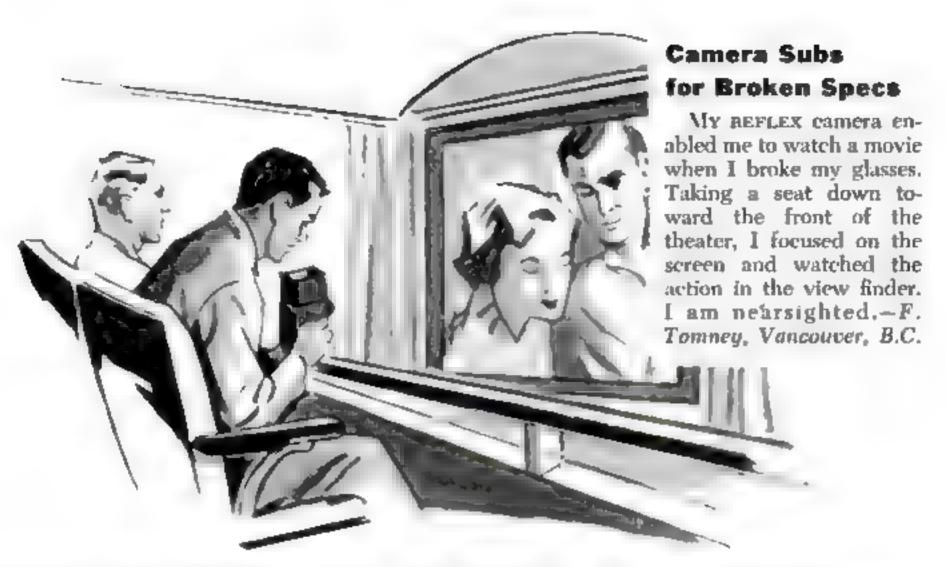
Right-Angle Guide Holds Hand Plane True for a Square Edge



Make all your edges square ones by clamping a plywood guide to your hand plane. Tack a spacer strip along the bottom



of the guide so that the flat edge, not the corner of the blade, does the cutting .- J. M Finn, Pittstown, N. J.



Man-Size Workshop Ash Tray Rests on a Disposable Can

Ir you need a large ash tray in your shop, this one will fill the bill. It has a pipe knock and can serve as a convenient pipe holder.

TRAY IS TURNED from two blocks of wood, Brass pushin center snuffs eigerettes.

D FIT CAN

Water in the can will give added safety. A piece of wood, 2%" by 8" by 8" glued up

or solid, is needed. The stock should be turned round and the base hollowed out to fit the lip of a can Screw a 1" by 6" by 6" piece of wood to a faceplate and turn for a snug fit with the 2%" piece. Use your dividers to lay out six equal parts on the 1" faceplate turning. Run the lines across and down for later reference. Draw six 1" circles, 3%" between centers as shown. Drop a spot of glue in each circle and clamp the two turnings together until the glue sets. Turn and drill as shown, then determine the location of the glue spots from the extended lines on the 1" piece. The two pieces will separate after you have marked and drilled the holes with a 1" wood bit. Next, insert the push-fit brass bushing and notch the rim for the cigarette rests.-Vern Forsberg, Seattle.



Wire Catches Saw-Arbor Nut

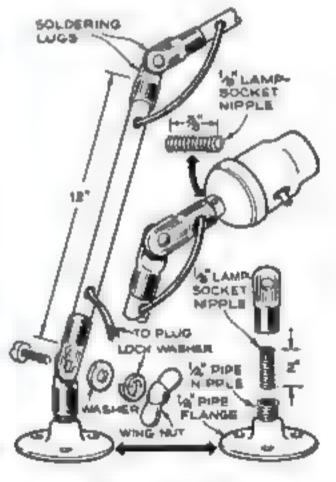
SAVE poking through the sawdust box for a lost nut by snapping a piece of wire against the end of the saw arbor to catch the nut when changing blades. Bend the wire so it stays in place while you loosen the nut.—H. A. Clark, Springdale, Ark



Plastic Takes Place of Glass

ACETATE is the answer if you want to replace broken glass in small oval or round picture frames. This clear-plastic sheet, available in office-supply or stationery stores, can be cut with a pair of seissors.—Arthur R. Tanner Jr., Cold Spring, N. Y.





Tin-Can Bench Light Swivels to Any Angle on Soldering Lugs

Six heavy-duty soldering lugs, joined by bolts and wing nuts let you angle this bench light into any position to suit the job or machine you're working on.

Buy lugs that will fit over the threaded nipples used to fit lamp sockets to bases. These nipples are threaded %" pipe size and are about %" outside diameter. Solder lugs on both ends of two 12" lengths of %" o.d. brass tubing for the adjustable arms and solder lamp-socket nipples (at , t' e re nam-

ing two lugs. Mount a lamp socket on one nipple and sweat the end of the other nipple into a %" pipe nipple. Screw a %" pipe flange on this nipple and mount it on the bench or machine. Drill the tubing and thread lamp cord through it, leaving slack at each swively joint.

Make a durable shade for the bulb by cutting a hole in a tan can just large enough to fit over the threads on the lamp socket.—

J. M. Finn, Pittstown, N.J.

[Continued from page 130]

in the upright exhaust stack, exploding with a belching of black smoke. It sounded not like one loose ignition wire making and breaking contact, but like two or three. Beside the tractor ran Hanratty and Blinstock, yelling varied instructions to Ezra.

"Pull out the choke, you blue-faced walrus," Hanratty screamed, "She am't getting enough gas."

Check and Double-Check

Ezra stood up on the tractor, shaking Ins fist as he yelled back. Gus ducked his head under the instrument panel, He began checking the wires in front of Ezra's quivering and bony knees. A loose ammeter or ignition-switch wire, bouncing around, could be causing the inissing. But why hadn't it missed, Gus asked himself, when he rode the tractor around the field? Gus couldn't find any loose wires, but just for luck he tightened the connections on the instrument panel with a deep-socketed spin draver. Then he jammed his hand down on the starter button. The motor broke into a smooth, even song.

"Now," Gus declared, straightening up to look into three pairs of cagey eyes, "what do you know about that?"

"I only know that she's hitting and I'm cutting," Ezra said excitedly. "Stand back, Gus."

It's Easy When You Know the Answer

As the old man shifted and then eased up on the clutch, the motor took hold smoothly, then missed. Gus walked along the side, peering in at the motor through the open side of the hood. Suddenly he signaled Ezra to kill it, worked on the engine a few moments with both hands, then dragged the side of the hood out from behind the tractor. He clamped it firmly in place.

He walked off down the field in a cloud of hoppers, chuckling to himself. In Mrs. Hendricks' kitchen he ate his pie and drank his cold milk.

"Don't you dare tell those boys what

was really wrong, unless it happens again," he told Mrs, Hendricks with a grin. "Then you go out and show them up by fixing it yourself. It was the darndest thing I ever saw, for a fact. With one side of the hood off, those big grasshoppers were getting in there on the motor, and actually shorting out the plugs by standing on the tops of them with their forefeet, their hind kickers on the block. The shock of the juice passing through their bodies held them there It didn't seem to cripple them a bit, either. When the motor stopped they hopped off the plugs, spry as you please. When I rode the tractor around the field I had my shoulders in the hood opening so they couldn't jump in."

Mrs. Hendricks had a happy gleam in

her eye.

"Gus," she said fervently, "I'd get a store of enjoyment out of making those three look like even worse monkeys than they act—the poor dears. I surely would. Here, you'd better have another piece of pie."

NEXT MONTH: Gus rides out a storm.

Junion couldn't wait to try out the midget electric racer he had built, so while his father was playing golf, he borrowed the battery out of the family sedan. With commendable restraint he ran the racer only a few minutes. Then he replaced the battery, tightened the terminals well, and sounded the horn. A vigorous toot indicated plenty of charge left, and Junior decided to say nothing about the loan. But his father had hardly got into the car that afternoon when he promptly got out again, without even trying the starter.

"You should have told me about using the battery, son," he said. "Now it looks as if I'll be a bit late for my ap-

pointment."

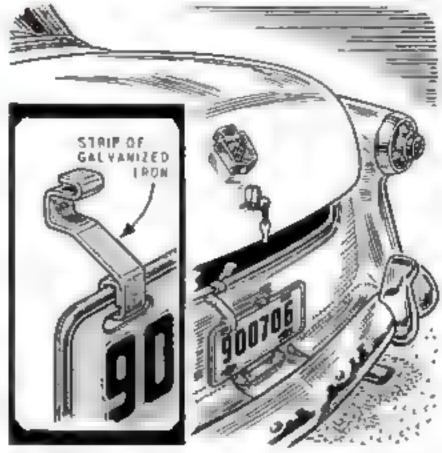
. How Come?

ANSWER: When his jother turned on the ignition, he noticed the ammeter swinging to charge, Junior had put the battery in backward, and it was nocestary to reverse it to prevent reverse therging and damage to the plates.

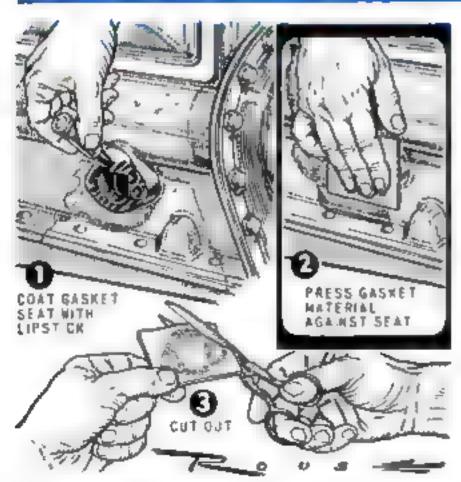
FROM THE MODEL GARAGE



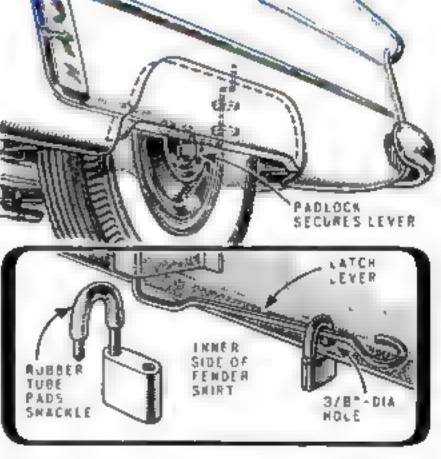
Stow a damp cloth in a plastic bag for cleaning dust and insects off your windshield between stops at service stations. Moisten the cloth with water or windshield cleaner and snap a rubber band around the neck of the bag to keep the fluid from evaporating.



To foll gas thieves, bend a length of galvanized strap iron to fit the top slot of the hinged license plate and the edge of the trunk opening. With this arrangement, a gas cap behind the license plate cannot be removed easily without unlocking the trunk.

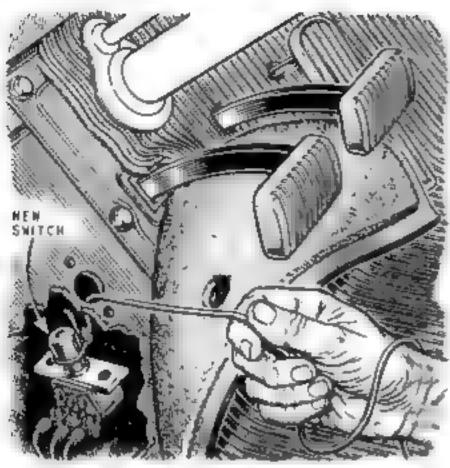


Use ilpstick to outline the shape of a flange on sheet material when cutting a gasket. Smear it over the entire surface and press the gasket material against it. The resulting imprint will show the outline as well as the hole locations.

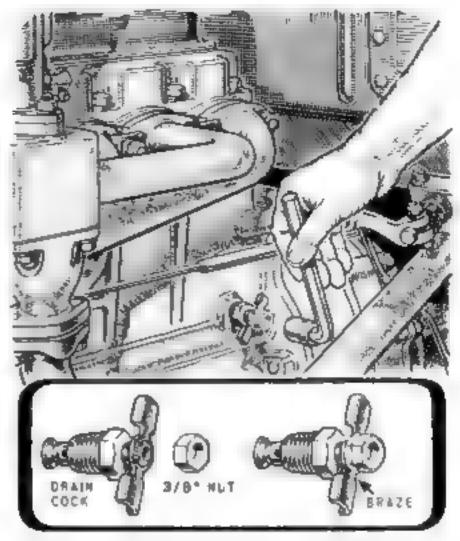


Thieves can't remove fender skirts if you fit them with padlocks to hold the clamping levers closed. Slip a lock over the lever arm and through a hole drilled in the bottom edge of each skirt. Cover the shackle with rubber tubing to keep it from rattling.

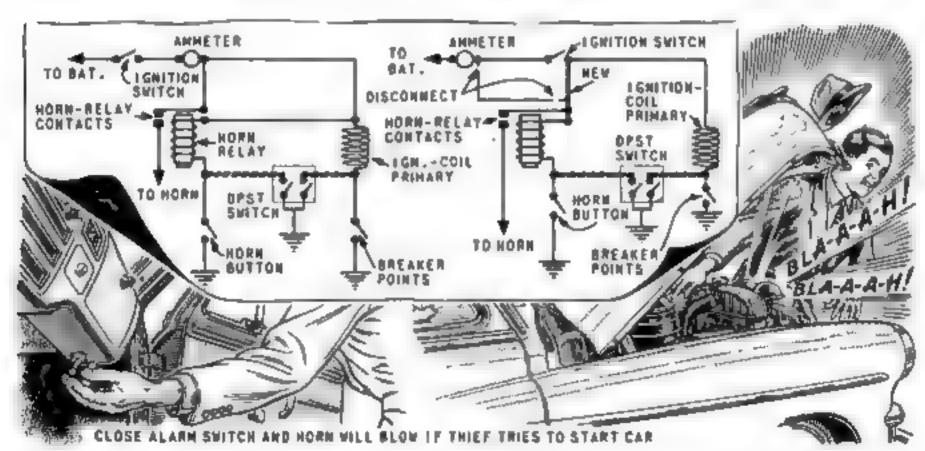
MORE Hints from the Model Garage



Tie a string to an old headlight dimmer switch before removing it to install a new one. This way you can pull the old one down by its wires and connect the wires to the new one. The the string on the new one and pull it up from inside the car.



Braze a %" nut on the T handle of your car's drain cocks to make them easier to turn. They are usually hard to reach, too, but a 12-point socket wrench will slip over the nut easily and open the drain in the tightest spaces. Water runs through the out.



Throw a toggle switch concealed under the dash when you leave your car, and a thief's attempts to start it with a trick key or by jumping a wire to the coil will be loudly announced by a steady blast of the horn. Even if he cuts the horn wire to work in silence, he won't start the engine; the breaker points are grounded and won't spark.

The diagram at left above shows how to wire a double-pole, single-throw toggle

switch on cars having the horn relay wired through the ignition switch. Heavy lines indicate the new wires. On other cars, the toggle wiring is the same, but the horn relay is disconnected from the ammeter or starter post and rewired to the ignition switch as in the diagram on the right. In either case, the horn cannot be sounded with the horn button unless the ignition switch is turned on.

POPULAR SCIENCE MONTHLY

Mechanics and Homebuilding

JULY TO DECEMBER 1953

Items in heavy type are a page or more in length

	* * * *	4.5	
A			Het sparks, how to get ignition cobles, checking
Air compressor tank, restpreet Airplane, medel, turkeprep. All en wrench, double-ended Allen-wrench ideas	Nov Oct.	191 203 236	tomp keeps oil worm Oil filter, checking Radiator ant freezy label Radiator percock wrench Spark plug connection, Improving
wood Angle gauge from protractor Aquarium, perating	Det.	159 158 158	Spark-plug tester, using. Spark plugs, what to kee about
AUTOMOBILES			AUTO WHEELS AND TIRES
Boby seat, eachoring Dashboard storage space. Floor mots from old rugs Hints from Madel Garage July 147, Aug. 161, 1	Orl. Dec Nov	199 199,	Brokee, parking, edjusting Chains, emergency repair Flat tire, device werns of Tire-pressure gauge, case to An, shorpening
Oct. 199, Nev. 199, De Dutboord can fuels car Seat cover from tobleclath Stalle sporks, avoid no	Nev Nev Nev Sept	200	Baby carriage, support for
Steering wheel, remount on	Supl	199	Back reat for banch

Sept

Vacuum cleaner, cut-down Sept. 222 Oct 199 Sept 200 195 Sept 200 Dec 182 Aug 142 Dec. 162 Sept 195 Safety buits, installing...... Doc. 183 Sender stops skidding Nov. 330 Snowplew attaches to car., Oct. 179 Speedometer cobies, adjusting Oct. 200 195 Nov. 202 Avp 161 Aug 162 July 149 Dec. 181 Windshield wiper, improving. July 150

AUTO BODY CARE

Trunk light ...

AUTO ACCESSORIES

Burglar atorm C garette chip

A r-temperature gouge

Cleaning brush, making

Glove-compartment shell

Inner tube carries water

Luggage rack for top. Peephole in sun visor

frouble light in trunk.

Trunk crip for work gloves

Warning signal, roadside

Beading, replacing	Nov.	200
C eoner, opplying	Qd,	200
Continental spare tire	Nov.	202
Doors, leave untatched.	Aug	161
Fender, installing	July	150
Spring shockle squeak, treating	g July	149
Squeaky mord np, rilencing.		
Trunk, spring holds open.		
Trunk, prop for lid.	Nov.	

Trauble light, rimit for Sept. Trauble-light bracket Nov.

AUTO ENGINE CARE

Bottery clomps, shield for Oct.	200
Bottery post, making	149
Breaker points, cleaning, Oct.	200
Distributor, improving Aug.	170
Engine, rebuilt, installing. July	140
Fan belt, instacting . Sept.	200
Grease fittings, sealing Nov.	199

Het sperks, how to get	Aug.	170
ignition cables, checking	Aug.	167
tomp keeps ail worm	Dec	177
Oil fifter, checking	Dec	181
Radiator get freeze lobel	Nov.	200
Radiator pelcock wrench	Sept.	199
Spork plug connection,		
Improving	Seet	199
Spark-plug tester, using.	Oct.	202
Sperk plugs, what to know		
	Sapt.	201
AUTO WHEELS AND TIRES		
Marie Asserted Minist (1972)		

Brokes, porking, edjusting Nov.	200
Chains, amorgancy repair Dec.	182
Flat tire, device werns of Dec.	
Tire-pressure gauge, ente for Oct.	
As, shorpening assessment July	156

Jely	172
July	
Oct.	189
Oct.	192
Nov	- 1
_	
	Oct.

Cobinet duers, sliding	Avg.	324
Comore, underwater rig for		
Condle sauffer, making.		
Condle warmer	Dec	224
Condles, foncy, making	Dec.	172
Cardboard bolds small tools	July	174
Cargo net, making.	Nev.	160
Costers, brod locks	Dec.	208
Cesting with Iron-posts		
malds	Supt.	224
Costing data conduction	Sept.	226
Contendritt, broken, freeing.	Oct.	246
Chains, aula, repairing.	.Dec.	182
Chair arm, paper clip for	Aug.	153

Chair seat, reveaving. Christman lights, control	July	176
panel fer	Dec.	216
Christmax projects	Dec	
Christmus tree, miniature.	Dec	
Christmos-tree train tennel	Dec.	
Christmas tree trunk, cult ng.	Dec.	
Chuck key hongs on hook.	Nov.	
Chuck key toped to power cord	Nov.	220
Cigarotto lighter, servicing.	Oct.	
Cigaretto-lighter base,		
plastic	Sopt.	190
Ciparette-lighter wheel, making	Nov	234
Cigarette-making machine	Oct.	214
Clomp, emergency	Sept	235
Cramp, gluing, hanger makes	Nev	234
Clamps enlarged with blocks.	Dec.	170
Clamps for small tubes	Oct.	234
Cleaner, aute, poplying	Oct.	200
Clipper-ship model, building	Dec.	202
Clock meters, seared, pilling .	. July	171
Clothes togs from con tops	Dec.	176
Clothespies, Improving	Dec.	169
Coins, solution tests.	Oct	211
Color photography	July	179
Centinopial spare fire	Nev.	202
Cookbook holder, moking.	Dec.	224
Corners, radius of, measuring.	Sept .	2 J8
Corrugated strip holds small		
teols	Alor	176

CRAFTWORK

molds	Sopt.	224
Cruftwork, buying wood for	Supt.	218
Cupboard, narrow-base	Oct.	227
Cuphoard latches, hidden	Aug.	CAL
Cutting board, Improving	Aug.	153

Deguerrostype photography Oct. 236

DATA CARDS

Costing ,	Sept.	226
Hardboard, band ng	Oct.	210
Dosk, wrought-iron-and-		
plywood	Aug.	200
Desk light, making	Sept.	
Developing tank racker	Oct	
Distronory stand, making.	Nev.	_
D e horder for rathe taristack	Ave.	203
Dish huider from record rock	Nev	
Dividen, spider centers	Sept	
Olving, using snorkel.	July	
Diving lung, making	July	
Diving lung, us ng.		165
Dogheuse, fenced yard for	Nov	234
Daghquie door, dog spens.	agly	135
Dellhouse, profeb	Dec.	
Dollhouse furniture	Pec.	
Doors, cabinet, sliding.	Aug.	
Dears, garage, everhead.	Aug.	
Deers, plywood-less,		
resultierig	Det	173
Drower pulls, anchoring.	.Pec.	
	11-0-0	
DRILLS		

Cardboord rack holds drills. S Centerdrilly, broken, freeleg		
Dry I stirp o'd point		
fathe compound on drill		
PF086 - 111 11 111 1	Ave.	201
Maynet cleans holes	Ngv.	227
Rotory vise, bushing centers	July	165
Sanding accessory		
Splintered holes, preventing.	Nev.	240
Tape sets drill depth		
Driveway, laying out	Avg.	162
Driveway guides, making.	Dec.	182
Drume, steel, projects for		

and the second of the second o	40.0	
Electric Iron, testing.	Det.	
Electrical-appliance tester	Oct.	215
Electrical clamp, emergency	Dec	170
Electrical parts, marking.	Dat.	170
End table makes plant stand.	Oct.	728
Evergreen trimming on door	Dec.	171

EXPERIMENTS			Nedge-clipper coble, impreving	July		I, J, K
How to beet 1.0 host New to see a guest	Aug. 1		Haight, measuring with sticks Hinges, storing	Aug		ice frezen in plentic bettles - July 172
Selution shows up phony calm			Hale gauge for Not steel	Duc.		Inno tube is water carrier Aug 142 Insulation, all about 100v. 205
Super-sneep with ultraviolet	Nev. 1		HOME MAINTENANCE			Insulation, installing Oct 240 tron, tooling cobinet for July 194
Watch, checking by sters	.Od, 2	211	Beby curriage, sepport for			from testing Oct. 220
F			Sed becomes sefe.		244	Jousty tray Dec. 274 Joists, jip for eqiling Sept 242
Force, leavered, how to make	July 1	194	Bed screen-toble	"Nety Nov.		Keys joined for carrying Nov. 274 Kitchen brunch bar Dec. 149
Pence posts, treating	Aug.	154	Bud slots, excharing.	Swot	234	Kitchen get reckJuly 173
Fender, outs, natelling Proplemes, profes	July Oct. 1			July Sept.		Karle, circular shorpening July 154 Karle, madeling, charpened Aug. 146
Fire screen atominum Fish tents downt persons	Dec		Bookrock, making Book rock, making	Nev. Dec.		Knorling motel bands,
Fireblight lens, emergency	Dec	171	Box of counter for poolings	Aug	153	E .
Files repelled by colton. Francis, idventy, structure	Ang 1		Christmas cookies, making Christmas door decoration	Dec.	171	
Fall cotches paint drips Food fractor, how to build	Aug. 1		Christmas-light controls Christmas tree, ministers	Dec.		Lodder, storage rock for Sept. 240 family, hambon, makingOct. 792
Food warmer, making.	Sept 2	226	Clathespies, improving	Dec.	169	Lamp, capper-tube, makingOct. 214 Lamp for garage. Sapt. 204
Feetsteel, making Presser, how to build	Dec. 2		Clathes legs from cen fees Cain haider in drawer	Dec Ave.		
FURNITURE			Condensation, guarding	Nev.	210	LATHE
			Condensation, vents provent	Dec	147	Callete, extre jobs forAug. 202 Compound used as drill
Back rase makes had a sele	Hev. 2	144	Condiment cabinet Content holder	July Dec		fixture Avg. 208
Bookcoon, plane-shaped	Det. 2	144	Cooking tester	Det Ave.		Coluff tool, improving July 185 Blot Indicator graduates
Cabinat dages, sliding Cabinal latches hidden	Avg. 2	148	Cupale and weather vene Cutting board, improving	Avg.	133	sollers Dec. 230
Cord table, making Chairside cabinet hides	Seat 2	226	Disk holder from record rock Boors, plywood foce,	Nev.	203	Pollower rest Chr. telistock July 184
radio	Aug. 1	186	mank long	Bet.	173	Foot group foods content - July 185 Hatder prips throaded work - July 184
Pesk of wrought from and plywood	Aug. 2		Drawer inverted is typing stand	Mex		Energing mated bands. Sept 238
End tobio File makes home cobinet	Oet Dec		Drawer gulls michering Dry well, wester drum mekes	Duc.		Lamp moves with roof bit Sept 239
Hinges wrought tree, dummy	Ner :	245	Dust best in Heer	Ang.	154	Load scraw appear divisions Oct 245 Oil drip fooder Sept 238
Road-map table Wrought-Iran logs, using	Nev. 2		Pance, lauvered, making	Avg.	154	Roomer Floats in tellstock. Nev 238
Wraught-iron table, faiding	Sept. 2	237	Fire streen, aleminum.	Oct.		Spider confert dividers. Seet 239 Tailstock die helder Ave. 203
_			Floors, squasky, silencing	Dec.	172	Lift sawing structure wood. Dec. 189 Lifting with ringing Sopt. 179
G			Fluorescent light over stave. Food fronzer, building	Avg.	133	Unations links for drawers July 158
Gerege, expunding	Dec	177	Feetsteel, making Fact all tank, repairing	Det	776 194	Lumber, corrying on pictury Nov. 202
Garage, well bumpers for Garage doors, overhead.	Ave.	161	Insulation, all about	Nev.	204	
mil about	Avg. 1	143	Insulation, lestalling Iron, cooling cobinet for	Oct		M, N, O
Gerage lamp, making	Sopt. 2	204	Kitchen brunch ber Kitchen gebinet, beurte hung	Det.		Magnet cleans hales Nev 227
GARDENS AND GARDENING			K schen cuphoord	Oct.	227	Magnetic last reals, marking Oct 240 Magnets, new uses for Oct. 191
Concrete welks, making	Sopt. 1		Kanthy pine, ham to untique Laundry hamper sirs cluther.	Oct.		Magnifier clies to procil Oct. 189 Mailbox, making management Nov. 251
Greet, culting in summer Greet seed setting	July	133	Light both, broken, freeing	Oct.		Metal, etchingJuly 137
town dower, improving.	ylet		Metal file makes subject	Dec	171	Motel-cutting bandsew 223 Metal stamping, (ig for Aug. 207
Tracturs, homomada	Aug. 1	194	Mirror lights stoker bin Puns, charred, cleening	Avg		Mirror lights atoker blet .Dec. 169 Alter bur, opnor public cutting, .Aug. 161
Walls, retaining, all about Wall saver dresses up			Plant stand from and table	Oct	278	
Wheelborrew Improved	July 1 Ave.		Pleater, music hate Put rack for kitches.	July	173	MODEL MAKING
Giate, afching	July	156	Redistor, dusting Redistor cover, moking	Sept	234	Cortridge cases make trim Nev 274 Cilpper ship, how to build Dec. 202
G uves, frunk cito for Gluing clomp, emergency	Aug.	235	Rodinter valves, cleaning Rod oters, improving	Nev		Sream plant Oct. 212
Green, culting in summer	Nev		Reiling, pluraleum	Dec	144	Tractor run by radio Aug. 188 Turbanco Rias plane Sopt 191
Grass sand patting	July	135	Screen door closes Itself	Sept		Modeling kerle, sharpening. Avg. 148 Molding, squaeky, sitencing. July 150
Greese gun pewer apprecial	Nev 2		Shewer, back-yard Smoking stand, making	July Sept		Matery, seated clock, eiting July 171
Out rack, locking	Det. 2	205	Steps defy ret	Aug.	199	Mower, geseline, servicing Oct. 729 Muffler for power mower Sept 240
GUS			Topo, collulose, removing. Topo, throad tips off	Dec.		Makt light on model conter Dec. 218
-and the job that				Sept Dec	234	Hylen, new uses for Nov 234
hockfirpd	Oct.		Tray, sliding, for huttles.	Aug.	154	Ohumeter, making Oct. 218 Oilcan, spart extension for Dec 227
—goes hunting for	•		Trunks stide on heltle cops Vaccum-closurer hose,	Nov.	204	Olf-steve burners, protecting. Sept. 233
-pops up a Head truck	Aug. 1	158	Vese, tip-proof	Oct		
-rides with Sente Claus.	Dec. 1	178	Wall stud, cutting	Oct.	240	
homostond	Sopt. 1	196	Washer corner unit houses Water heater coils, Bushing	Nev.		Pads, namello, for houts
н			Window screens,	Dec.		PAINT AND PAINTING
			Wood speen, improving	July	177	Compressor tenk, custorealing Dec. 227
Hamper airs loundry	Nev.		Woodpile, vermin free Warkshop chips are boarth	Oct	189	Squabourd, guarding Dec. 170 Smush, care of July 181
Hardhoards, all about	Oct. 2	206	feel	Nev		Brush, sift bandla July 158 Brush bant bandy Oct. 234
Heat, how to heat the	Aug.	144	Het spurks, gut them eftente		.,-	Greek major major 190. 234

Dri I stirs old paint			Scading spindle, meking	Dec	227	Shopsmith Bets new	A 102
Foll pround can catches drips Malder keeps brushes in	Aug.	101	Sosh-cord knots, shellar	Sant	240		Aug. 182 Dec 228
rator coops brushes in	Od	189	Sewherses, how to build.	Jacky	152	Towel halder, gluminum	
House painting, all about.					132	terest income, decomposition of	.mps; 101
Painting pointers			SAWS AND SAWING			tors	
Yarnishing with swab-	Od.	240					
Poneling, wood, tip en.	Dec	170	Sandsauring strutches				Sept 280
	Aug.		lumber	Nov.		Beach toys, marking	July 135
Paperhanger's roller, swoothing Pencil sharpened with sander			Macksowing slots Holp saw, disk ejector for	Dec.		Corpo set Doithouse, profets	Nov 180
Phosograph-record cabinet			Jissaw extra table for	Nov.		Dol house furniture	Dec 218
Propagation Control Control		. 42	Jegrow, plostic insert for		174	Dumbbeli .	Oct. 234
PHOTOGRAPHY			Jigsow bloder, chonging	Nev		Helicapter Jamp	Dec 218
			Lift sawing stretches			Plywood playhouses	July 129
Antique photography			wood	Doc.		Radio space helmat	De4, 209
Bo look seals chemicals	Oct.	187	Metal-cutting hundrew	Oct.		Swim pool, plastic, inflating.	
Scittus derkroom Sex-compay winged	Mov.	100	Orter, leakproof for sow	_	176		Aug. 188
Comers, undervister	mer.	174	Sow vise is banding brake Three-D photos show	Sept	237	Train, push button controls.	Dec. 198 Dec. 217
rig for some management	July	166	HEW OFFERS	Aug.	141		Sept. 191
Color photos, how to take	July	179	Work supports for			Tructur seat makes stool.	July 176
Cricket gets attention	Aug,	180	Sower saw	Dec.	194		Aug. 194
Developing tonk, water rocks	. Od	194	Scroper, rator blode	Nov			Aug. 196
Eosel, weighted, can t sip-	Nov	220	Screen-door kinges improved.	Sept.		Trivet, lozy-longs	Oct 217
Fireworks, photographing	July	179	Screen toble	Nov.			Sept 236
flosh extension clamp	Nov.	240	Strewdsiver, small, wire.	Dec.			Nov. 221
Flock gun, converting water	.Peov	224		Nev.		Tubes, reli up squeezer fer	Oct 245
Floodlight, vocuum cup held Funny photos mode	· OG	494	Severew acts on key Sewing machine bose is table	Oct		Tubing, hinge pin flores.	Que. 198
with microry	Aug.	204	Shelf, small, for clock	Aug.		Ternings, debutting Typewriter, vacuum-cleaning	Nev 220
Ground glass, etching.	July	156	Shift automotic, for scooler			Typing on Inverted drawer	Nev 203
How a pre sheets			Shoes, how to pack			The state of the s	
feetball see sees	Sept.	331	Shower, back-yord	July	172	II V W V	
Lebels can't smear	. Dec	230	Sidewolks, teaking	Sopt.	164	U, Y, W, Y	
Triped legs, strap holds	Dec.	169	Small parts, cleaning			Mineral II also seem dee	Marca 840.0
Pipe frome makes dog yerd.	Per.	222		Dec		Ultrevialet light, uses for	146A' IA I
Planter, musical-note	Deci	244	Snork tobbe	Dec		Upholstery tocks, using	Oct 227
Plastic, embedding decarations in	Aun	183	Snorkel, using	July Dec.		Vacuum cleaner, cut-down	
Pigatic, etchina			Snow mask, how to make Soop pewder, how to make		174	Vecum cleaner hase, fastening	
Plactic battles at ice males	July		Soldering tron, 1 mer shuts off			Vacuum cloaner infigies swim	
Plastic box makes			Soldering iron farnace	Nov.		poel	Ave 183
lighter base	Sept.			Od.		Vacuum cluener on wheels	Nov 240
Plastic covers, uses for	Aug.	194	Speen, wooden, Improving.	July	173	Vase, 1 p-preef	Dec 171
Plywood, mere for		414	Spetlight, shop, portable .	Arg.		Venetian blind slat chair east	July 176
less money	Sept.		Stomping metal, 1-6 for	Avg.	202	Ventilate reem with louvers	Ave 181
Plywood, shopping for Plywood-lace doors, making			Steen plant, medel,		0.10	Vise, small, on triped head Vise doubles as hand press	Dec 208 Sept 239
Plywood planks			making	, Der.	226	Vise punches holes	Oct. 246
build playhouses	July	129	Steel, kele pouge for	Oct.			Sept 235
Pot shing with sander	July		Steel drums, projects for Step steel, child's				Nov 194
Pat ruck, extension arm	July		Steps, how to hold.	Ave	199	Washer drum makes dry well	Nov 274
Press, vise doubles as	Sept		Steel from tractor seat		176	Wastebasket, washable	Aug 148
Putty, softening		172	Sterm windows, aluminum	Dec		Wastebasket on wall	July 151
Putty, keeping pliable	Pigy	244	Stove, old, uses for	Sept.		Watch, checking by clars	Oct 21
_			Stove light, fluorescent and a	_	227	Water-color polette, tape speel	Nev 220 Sept 242
			Steves, medern, installing	Oct.		Water-hapter cails, flushing Water pump and well caver	
	_		Stud, wall, cutting Swimming, aids to July 140,		240	Woler-pump pressure switch	July 1594
Radiator percock, wrench for	Sept	199	Switch, pressure, for pump	July		correction	Sept. 14
namatic .			correction	Sept.		Weather vene	Dec. 226
BADIO			Add de la dela de			Weather vans and cupela	Aug. 195
Antenna, phone helps	July	150	T			Weepen's funny pictures	Aug. 204
Portable radio, fail protects.	Nov.	194	3			Walder, pertable, how to	
Radio halmet, tay	Dec.	109	* d	Cont	220	horital	July 182
Radio-powered tay tracted	Aug.	366	Top depth. tops marks Tops, magnetic, marking resh.	Sept. Oct.		Welding, clamp holds work Wheelbaltew, sidebeards	July 184
Tubes, homemede			Tape, thread tips off	Ann.		IMPOTE	Aug. 147
rester for annual annual		44					-
Y L			Tope dispenser	Qct	189	Winch from auto transmission.	Oct 201
Tubes, removing	Nov	225	Tope dispenser Topping depth, not limits	July	185	Window screens, gluminum	Der, 164
Tubes tiny, clomp for	Nov	225		July		Window screens, gluminum Windshield wiper, improving	Dec. 164 July 150
Tubes teny, clomp for Wall cubinet for radio	Nov Oct July	225 234 136	Topping depth, not limits Telephone helps radio antenno	July	185	Window screens, gluminum Windshield wiper, improving Wood, all about buying.	Dec. 164 July 150 Sept. 205
Tuber tiny, clomp for Wall cubinet for realis Reduct gauge from tin com-	Nov Oct July Sept	225 234 136	Tapping depth, nut limits	July	185	Window screens, gluminum Windshield wiper, improving Wood, all about buying. Woods get two boards from	Dec. 164 July 150 Sept. 205
Tuber tray, clomp for Wall cubinet for radio Redus gauge from tin case Balling, aluminum	Nov Oct July Sept	225 234 136 238 166	Tapping depth, not limits Telephone helps radio antenno	July	185 156	Window screens, gluminum Windshield wiper, improving Wood, all about buying. Wood: get two boards from one	Dec. 164 July 150 Sept. 205 Nov. 188
Tuber tiny, clomp for Wall cubinet for radio Redius gauge from tin case Railing, eluminum Records fitp ever in cabinet Refrigerator, defracting	Nov Oct July Sept Bec. Aug. Hov.	225 234 136 238 166 187 204	Tapping depth, not limits Telephone helps radio antenno TTTTVTTUUI Antenna, almine	July July Duc	185 156	Window screens, gluminum Windshield wiper, improving Wood, all about buying. Wood: get two boards from one Wood, lift sawing stratches	Day, 164 July 150 Sept. 205 Nev. 188 Dec. 169
Tuber tiny, clomp for Wall cabinet for radio Redius gauge from tin case Railing, aluminum Records fitp ever in cabinet Refrigerator, defrasting Rafr perator door bumper	Nov Oct July Sept Dec. Aug. Nov. Avg	225 234 138 238 166 187 204 153	Tapping depth, not limite Telephone helps radio antenno untenno antenno Antenno, almine	July July Duc.	185 156 176 174	Window screens, gluminum Windshald wiper, improving Wood, all about buying. Wood: get two boards from one Wood, lift sawing stratches Woodpile, vermin free	Day, 164 July 150 Sept. 205 Nev. 188 Dec. 167 Oct. 189
Tuber tiny, clomp for Wall cabinet for radio Redius gaupe from tin case Ralling, aluminum Records fitp ever in cabinet Refrigerator, defrasting Refrigerator door humper Retaining walls, all about	Nov Oct July Sept Bec. Aug. Hov. Avg. Bug.	225 234 138 238 166 187 204 153 174	Tapping depth, not limits Telephone helps radio antenno TTTTVTTUUI Antenna, almine	July July Duc. Aug. Sept.	185 156 176 174	Window screens, gluminum Windshald wiper, improving Wood, all about buying. Wood: get two boards from one Wood, lift sawing stratches Woodpile, vermin free	Day, 164 July 150 Sept. 205 Nev. 188 Dec. 169
Tuber tiny, clomp for Wall cubinet for radio Reduce gauge from the case Ralling, aluminum Records fits ever in cobinet Estragorator, defracting Rafe perstandary descriptions walls, all about Rigging, all about	Nov Oct July Sept Dec. Aug. Hov. Avg. Sept.	225 234 138 238 166 187 204 153 174 379	Tapping depth, not limite Telephone helps radio antenno TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	July July Duc. Aug. Sept.	185 158 176 184 230 232	Window screens, eluminum Window screens, eluminum Wood, all about buying. Wood: got two boards from one Wood, life sawing stratches Woods is, vermin free Woods, how to identify Wordless Workshop July 238, Aug. 196, Sa	Day, 164 July 130 Sept. 205 Nev. 186 Dec. 169 Oct 189 Sept. 220 pt. 222,
Tuber tiny, clomp for Wall cabinet for radio Reduce gauge from the case Ralling, aluminum Records fits ever in cabinet Refrigerator, defracting Raft perstor door humper Retaining walls, all about Rigging, all about Rigging, all about	Nov Oct July Sept Bec. Aug. Nov. Avg. Sept. D.c	225 234 138 238 166 187 204 153 174 379 181	Tapping depth, not limits Telephone helps radio antenno TTTTUTUUT Antenna, almine	July July Duc. Aug. Sapt. Oct. Nov	185 156 176 184 230 232 224	Window screens, eluminum Window screens, eluminum Wood, all about buying. Wood: get two boards from one Wood, life sawing stratches Woods, how to identify Woods, how to identify Wordless Workshop July 338, Aug. 196, Se Oct. 192, Nov. 188, Doc.	Dec. 164 July 130 Sept. 205 Nev. 186 Dec. 169 Oct 189 Sept. 220 pt, 222, 200
Tuber tiny, clomp for Wall cabinet for radio Reduce gauge from the case Ralling, aluminum Records fits ever in cabinet Estragorator, defracting Rafe garator door humper Retaining walls, all about Rigging, all about Roads do worning signal Racking boot, toy	Nov Oct July Sept Dec. Aug. Hov. Avg. Sept.	225 234 138 238 166 187 204 153 174 170 181	Tapping depth, not limits Telephone helps radio antenno TTELUTION Antenna, almins	July July Duc. Aug. Supt. Oct. Nov	185 156 176 184 230 232 224 221	Window screens, eluminum Window screens, eluminum Wood, all about buying. Woods get two boards from one Wood, life sawing stratches Woods, how to identify Woods, how to identify Wordless Workshop July 138, Aug. 196, Se Oct. 192, Nev. 188, Dec. Workbench-drawer, hondle for	Dec. 164 July 130 Sept. 203 Nev. 188 Dec. 169 Oct 189 Sept. 220 ipt, 222, 200 Dec. 227
Tubes tray, close for Wall cabinet for radio Reduce gauge from the case Relifing, aluminum Records fits ever in cabinet Estragorator, defracting Refr perator door humper Retaining walls, all about Rigging, atl about Roads do worning signal Recking boot, toy Repo, how to splice Rose sign, how to make.	Nov Oct July Sept Bec. Aug. Nov. Ave Bug. Sept. D.c Nov. Sept. Sept.	225 234 138 238 166 187 204 153 174 370 181 182 382 229	Tapping depth, but fimile Telephone helps radio antenne TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	July July Duc. Aug. Sapt. Oct. Nov Nev. Aug.	185 156 176 184 230 232 224 221 154	Window screens, eluminum Window screens, eluminum Wood, all about buying. Wood: get two boards from one Wood, life sawing stratches Woods, how to identify Woods, how to identify Wordless Workshop July 338, Aug. 196, Se Oct. 192, Nov. 188, Doc.	Dec. 164 July 130 Sept. 203 Nev. 188 Dec. 169 Oct 189 Sept. 220 ipt, 222, 200 Dec. 227
Tubes tray, close for Wall cabinet for radio Reduce gauge from the case Railing, aluminum Records fitp over in cabinet Estrigorator, defracting Refr perotor door humper Retaining walls, all about Rigging, all about Rogals de worning signal Racking boot, toy Rope, how to splice Rope sign, how to make. Retary vice, bushing centers.	Nov Oct July Sept Bec. Ave Ave Ave Sept. D.c Nov. Sept. July	225 234 138 238 166 187 204 153 174 370 181 142 382 229	Tapping depth, not limits Telephone helps radio antenno ITTIVITUALI Antenna, windersofting Executes, windersofting Eyestroin explained Tubes, checking with micror Tubes, businessed tester for Volume, checking Tie rock, folding	July July Duc. Aug. Supt. Oct. Nov New. Aug. New.	185 156 176 184 230 232 224 221 154 188	Window screens, eluminum Windshald winer, improving Wood, all about buying. Wood: get two boards from one Wood, life sawing stratches Woodp is, vermin free Woods, how to identify Wordless Workshop July 138, Aug. 196, Se Oct. 192, Nov. 188, Dec. Workbeach-drawer, hondle for Workbeach rock holds nails	Dec. 164 July 130 Sept. 203 Nev. 188 Dec. 169 Oct 189 Sept. 220 ipt, 222, 200 Dec. 227
Tubes tray, clomp for Wall cabinet for radio Reduce gauge from the case Railing, aluminum Records flip ever in cabinet Refrigerator door humper Retaining walls, all about Rigging, at about Rigging, at about Rocking bout, toy Rope, how to splice Rope sign, how to make. Retary vice, bushing centers. Rubber, frozen, mochines wall	Nov Oct July Sept Bec. Ave Ave Ave Sept. Dec Nov. Sept. July Dec	225 234 138 238 166 187 204 153 174 370 181 142 382 229 183 228	Tapping depth, not limits Telephone helps radio antenno TTELLULL Antenna, almine	July July Duc. Aug. Supt. Oct. Nov Nev. Aug. Nev. Supt.	185 156 176 184 230 232 224 221 154 186 238	Window screens, eluminum Window screens, eluminum Wood, all about buying. Woods get two boards from one Wood, life sawing stratches Woods, how to identify Woods, how to identify Wordless Workshop July 138, Aug. 196, Se Oct. 192, Nev. 188, Dec. Workbench-drawer, hondle for	Dec. 164 July 130 Sept. 203 Nev. 188 Dec. 169 Oct 189 Sept. 220 ipt, 222, 200 Dec. 227
Tubes tray, clomp for Wall cabinet for radio Reduce gaups from the case Railing, aluminum Records flip over in cabinet Refrigerator door humper Retaining walls, all about Rigging, atl about Rigging, atl about Rocking bout, toy Rope, how to splice Rope sign, how to make. Retary vice, bushing centers. Rubber, frozen, machines wall Ruler, typewriter calibrates	Nov Oct July Sept Bec. Ave Ave Ave Ave Sept. Sept. Sept. July Dec. Dec. Dec. Dec. Dec.	225 234 138 238 166 187 204 153 174 370 181 142 382 229 143 228 149	Tapping depth, not limits Telephone helps radio antenno ITTIVITUALI Antenna, windersofting Executes, windersofting Eyestroin explained Tubes, checking with micror Tubes, businessed tester for Volume, checking Tie rock, folding	July July Duc. Aug. Supt. Oct. Nov Nev. Aug. Nev. Supt.	185 156 176 184 230 232 224 221 154 186 238	Window screens, eluminum Windshield winer, improving Wood, all about buying. Wood: get two boards from one Wood, life sawing stratches Woods, how to identify Wordless Workshop July 138, Aug. 196, Se Oct. 192, Nov. 188, Doc. Workbeach-drawer, handle for Workbeach rock holds nails WORKSHOP AIDS	Day, 164 July 130 Sept. 203 New, 188 Dec. 169 Oct 189 Sept. 220 opt, 222, 200 Dec. 227 July 151
Tubes tray, clomp for Wall cabinet for radio Reduce gauge from the case Railing, aluminum Records flip ever in cabinet Refrigerator door humper Retaining walls, all about Rigging, at about Rigging, at about Rocking bout, toy Rope, how to splice Rope sign, how to make. Retary vice, bushing centers. Rubber, frozen, mochines wall	Nov Oct July Sept Bec. Ave Ave Ave Ave Sept. Sept. Sept. July Dec. Dec. Dec. Dec. Dec.	225 234 138 238 166 187 204 153 174 370 181 142 382 229 183 228	Tapping depth, not limits Telephone helps radio antenno TTELLULL Antenna, almine	July July Duc. Aug. Supt. Oct. Nov Nev. Aug. Nev. Supt.	185 156 176 184 230 232 224 221 154 186 238	Window screens, eluminum Windshield winer, improving Wood, all about buying. Wood: get two boards from one Wood, life sawing stratches Woods, how to identify Woods, how to identify Wordless Workshop July 138, Aug. 196, Se Oct. 192, Nev. 188, Doc. Workberch-drawer, handle for Workberch rack holds nails WORKSHOP AIDS Coffee cans held herdware Emery strips, halder for.	Dec. 164 July 130 Sept. 203 New. 188 Dec. 169 Oct 189 Sept. 220 ept. 222, 200 Dec. 227 July 151 Oct 228 Dec. 228
Tubes tray, close for Wall cabinet for radio Reduce gaups from the case Railing, aluminum Records fite ever in cabinet Refrigerator door humper Refrigerator door humper Retuining walls, all about Rigging, atl about Rogging, atl about Rogging, how to splice Rope, how to splice Rope sign, how to make. Rotory vice, bushing contern. Rubber, frozen, machines wall Ruler, typewriter calibrates Rust, retroving	Nov Oct July Sept Bec. Ave Ave Ave Ave Sept. Sept. Sept. July Dec. Dec. Dec. Dec. Dec.	225 234 138 238 166 187 204 153 174 370 181 142 382 229 143 228 149	Tapping depth, not limits Telephone helps radio antenne ITTIVITUALI Antenna, alming	July July July Sugt. Oct. Nov New. Aug. Mev. Supt. Aug.	185 156 176 184 230 232 224 221 154 186 238 147	Window screens, eluminum Windshield winer, improving Wood, all about buying. Wood: get two boards from one Wood, life sawing stratches Woods, how to identify Woods, how to identify Wordless Workshop July 138, Aug. 196, Se Oct. 192, Nev. 188, Doc. Workberch-drawer, handle for Workberch rock holds nails WORKSHOP AIDS Coffee cans held herdware Emery strips, halder for. Na I contourers, making	Dec. 164 July 130 Sept. 203 New. 188 Dec. 169 Oct 189 Sept. 220 et. 222, 200 Dec. 227 July 151 Oct 228 Dec. 228 Dec. 208
Tubes tray, clomp for Wall cabinet for radio Reduce gaups from the case Railing, aluminum Records flip over in cabinet Refrigerator door humper Retaining walls, all about Rigging, atl about Rigging, atl about Rocking bout, toy Rope, how to splice Rope sign, how to make. Retary vice, bushing centers. Rubber, frozen, machines wall Ruler, typewriter calibrates	Nov Oct July Sept Bec. Ave Ave Ave Ave Sept. Sept. Sept. July Dec. Dec. Dec. Dec. Dec.	225 234 138 238 166 187 204 153 174 370 181 142 382 229 143 228 149	Tapping depth, not limits Telephone helps radio antenne ITTIVITUALI Antenna, alming	July July July Sugt. Oct. Nov New. Aug. Mev. Supt. Aug.	185 156 176 184 230 232 224 221 154 186 238 147	Window screens, eleminum Windshield winer, improving Wood, all about buying. Wood, all about buying. Wood, life sawing stratches Woodp le, vermin free Woods, how to identify Wordless Workshop July 338, Aug. 196, Se Oct. 192, Nev. 188, Dec. Workbeach-drawer, hondle for Workbeach-drawer, hondle for Workbeach rack holds nailpain. WORKSHOP AIDS Coffee cans held herdware Emery strips, holder for. No I contoiners, making Shop table a.	Dec. 164 July 130 Sept. 203 New. 188 Dec. 169 Oct 189 Sept. 220 et. 222, 200 Dec. 227 July 151 Oct 228 Dec. 228 Dec. 208 Oct 194
Tubes tray, clomp for Wall cabinet for radio Reduce gaups from the case Railing, aluminum Records flip ever in cabinet Refrigerator door humper Retaining walls, all about Rigging, at about Rigging, at about Rocking bout, toy Rope, how to splice Rope sign, how to make. Retary vice, bushing centers. Rubber, frozen, machines wall fuler, typewriter calibrates Rust, removing	Nov Oct July Sept Bec. Ave Ave Ave Ave Sept. Sept. July Dec. July	225 234 138 238 166 187 204 153 174 174 181 142 382 229 145 228 149 156	Tapping depth, not limits Telephone helps radio antenne ITTIVITUALI Antenna, alming	July July July Supt. Oct. Nov New. Ava Mev. Supt. Aug.	185 156 176 184 230 232 224 221 154 188 238 147	Window screens, eluminum Windshield winer, improving Wood, all about buying. Wood, all about buying. Woods get two boards from one Woods lift sawing stratches Woods le, vermin free Woods, how to identify Wordless Workshop July 338, Aug. 196, Se Oct. 192, Nov. 188, Dec. Workbeach-drawer, hondle for. Workbeach rock holds nailpain. WORKSHOP AIDS Coffee cans held herdware Emery strips, holder for. No I contoiners, making. Shop table a. Small parts, storing.	Dec. 164 July 130 Sept. 203 New. 188 Dec. 169 Oct 189 Sept. 220 et. 222, 200 Dec. 227 July 151 Oct 228 Dec. 228 Dec. 208 Oct 194 Aug. 180
Tubes tray, clomp for Wall cabinet for radio Reduce gaups from the case Railing, aluminum Records flip over in cabinet Refrigerator door bumper Retaining walls, all about Rigging, atl about Rigging, atl about Rocking bout, toy Rope, how to splice Rope sign, how to make. Retary vice, bushing centers. Rubber, frozen, machines wall fuler, typewriter calibrates Rust, retroving	Nov Oct July Sept Bec. Ave Ave Ave Sept. Sept. July Dec. July	225 234 138 238 166 187 204 153 174 174 181 762 182 229 185 228 149 156	Tapping depth, not limits Telephone helps radio antenne ITTIVITUALI Antenna, alming	July July July Supt. Oct. Nov New. Aug. Hey. Supt. Aug.	185 156 176 184 230 232 224 221 154 186 238 147	Window screens, eluminum Windsheld winer, improving Wood, all about buying. Woods get two boards from one Woods lift sawing stratches Woods le, vermin free Woods, how to identify Wordless Workshop July 338, Aug. 196, Se Oct. 192, Nev. 188, Dec. Workbeach-drawer, hondle for Workbeach-drawer, hondle for Workbeach rack holds nailpain. WORKSHOP AIDS Coffee cans held herdware Emery strips, holder for. No I contoiners, making Shop table a. Small parts rack	Dec. 164 July 130 Sept. 203 New. 188 Dec. 169 Oct 189 Sept. 220 let. 222, 200 Dec. 227 July 151 Oct 228 Dec. 208 Oct 194 Aug. 180 July 151
Tubes tray, clomp for Wall cabinet for radio Reduce gaups from the case Railing, aluminum Records flip over in cabinet Refrigerator door bumper Retaining walls, all about Rigging, atl about Rigging, atl about Rocking bout, toy Rope, how to splice Rocking bout, toy Rope, how to make. Retary vise, bushing centers. Rubber, frozen, machines wall fuler, typewriter calibrates Rust, radroving	Nov Oct July Sept Bec. Aug. Sept. Sept. July Dec. July L July	225 234 138 238 166 187 204 153 174 174 181 762 182 229 185 228 149 156	Tapping depth, not fimile Telephone helps radio antenne ITTIVITUALI Antenna, alming	July July July Supt. Oct. Nov New. Aug. Hey. Supt. Aug.	185 156 176 184 230 232 224 221 154 188 238 147	Window screens, eluminum Windsheld winer, improving Wood, all about buying. Woods get two boards from one Woods lift sawing stratches Woods le, vermin free Woods, how to identify Wordless Workshop July 338, Aug. 196, Se Oct. 192, Nev. 188, Dec. Workbeach-drawer, hondle for Workbeach-drawer, hondle for Workbeach rack holds nailpain. WORKSHOP AIDS Coffee cans held herdware Emery strips, holder for. No I contoiners, making Shop table a. Small parts rack	Dec. 164 July 150 Sept. 205 New. 188 Dec. 169 Oct 189 Sept. 220 let. 222, 200 Dec. 227 July 151 Oct 228 Dec. 208 Dec. 208 Dec. 208 Dec. 208 Dec. 208 Dec. 180
Tubes tray, clomp for Wall cabinet for radio Reduce gaups from the case Railing, aluminum Records flip over in cabinet Refrigerator door bumper Retaining walls, all about Rigging, atl about Rigging, atl about Rocking bout, toy Rope, how to splice Rocking bout, toy Rope, how to make. Retary vice, bushing centers. Rubber, frozen, machines wall fuler, typewriter calibrates Rust, rattraving Sander, extra jobs for Sander, inner tube valve make Sanding, emery-strip holder for Sanding, wat, tip on	Nov Oct July Sept Bec. Aug. Nov. Sept. July Dec. July Dec. July Dec. July Nov.	225 234 138 238 166 187 204 153 174 370 181 762 382 229 185 228 149 156	Tapping depth, not limits Telephone helps radio antenne ITTIVITUALI Antenna, alming	July July July Supt. Oct. Nov New. Aug. Hey. July New July	185 158 176 184 230 232 224 221 154 188 238 147 176 220 185	Window screens, eleminum Windsheld winer, improving Wood, all about buying. Woods get two boards from one Woods lift sawing stratches Woods le, vermin free Woods, how to identify Wordless Workshop July 338, Aug. 176, Se. Oct. 192, Nev. 188, Dec. Workbeach-drawer, hondle for. Workbeach rock holds nailpass. WORKSHOP AIDS Coffee cans held herdware Emery strips, holder for. No I contoiners, making. Shop table a. Small parts rack Tool drawers, fining for Trush sack, double-duty. Workbeach, resurfacing	Dec. 164 July 130 Sept. 203 New. 188 Dec. 169 Oct 189 Sept. 220 pt. 222, 200 Dec. 227 July 151 Oct 228 Dec. 208 Oct 194 Aug. 180 July 151 July 151 July 151 July 158 .Oct, 194 Dec. 208
Tubes tray, clomp for Wall cabinet for radio Reduce gaups from the case Railing, aluminum Records flip ever in cabinet Retrigorator door bumper Retuining walls, all about Rigging, all about Rigging, all about Rods do worning signal Racking boot, toy Rope, how to splice Rope sign, how to make. Ratory vise, bushing conters. Rubber, frozen, machines wall fuler, typewriter calibrates Rust, ratroving Sander, extra jobs for Sander, inner-tube valve make Sanding, emery-strip holder for	Nov Oct July Sept Bec. Aug. Nov. Sept. July Dec. July Dec. July Dec. July Nov.	225 234 138 238 166 187 204 153 174 370 181 762 382 229 185 228 149 156	Tapping depth, not limits Telephone helps radio antenne ITTIVITUALI Antenna, alming	July July July Supt. Oct. Nov New. Aug. Hey. July New July	185 158 176 184 230 232 224 221 154 188 238 147	Window screens, eleminum Windsheld winer, improving Wood, all about buying. Woods get two boards from one Woods lift sawing stratches Woods le, vermin free Woods, how to identify Wordless Workshop July 338, Aug. 176, Se Oct. 192, Nev. 188, Dec. Workbeach-drawer, hondle for. Workbeach-drawer, hondle for. Workbeach rock holds nailpain. WORKSHOP AIDS Coffee cans held herdware Emery strips, holder for. No I contoiners, making. Shop table a. Small parts rock Tool drawers, fining for Trush sack, double-duty.	Dec. 164 July 150 Sept. 205 New. 188 Dec. 169 Oct 189 Sept. 220 let. 222, 200 Dec. 227 July 151 Oct 228 Dec. 208 Dec.

Dri I stirs old point Aug. Scading spiedle, making....... Dec 227 Shopsmith gets new

CRAFTSMEN AT WORK

Mower Cuts Weeds Under Water. This hand-built submarine moving machine keeps the water clear of weeds along the shore at Rainbow Springs, Fla. The sickle-bar cutter is raised and lowered by tackle and powered by a small gasoline engine



Diving Helmet from Oilcan. A two-gallon oilcan was the starting point for a diving helmet made by Eddie Hoffmeister of Colwyn, Pa. A tire pump feeds air through welding hose and a valve in the top of the helmet. Six 10-lb, weights, held in a carrying pouch, are attached to the helmet by a long pin.

In an emergency, the pin can be quickly pulled. This drops the weighted pouch and permits the helmet to shoot to the surface, leaving the diver free. Nineties pumper below would throw a nice stream of water at a doll bouse fire. All control valves and dials work, even the brakes. The entire model is brass and bronze, including wheels that are spring at the rear The steam cylinder has a %" stroke and %" bore, the pump, a %" stroke and %" bore. The five-tube boiler is heated by alcohol Built by Dr. Alex Christensen of Lebanon N.J., the steamer is an exact copy of an old-timer still in existence.



POPULAR SCIENCE MONTHLY

Mechanics and Homebuilding

VOLUME 164 DE X NOS. 1 to 6

JANUARY TO JUNE 1954

Items in heavy type are a page or more in length

Ì	ļ	ŀ	

Aluminum Insulation, uses for Mor. 197 Aluminum pipe fittings, using Feb. 201 Anv I, sy inder head makes. Feb. 250 Ashestos shingle shields forch. Feb. 233

AUTOMOBILES

Bock-seat proy table.	May	
Backup donger signal	June	
Carside cabona, making	May	172
Car tools, Improving.	Apr	267
Cor-top bedroom, building.	May	149
Door handles, sawed off	Mar	226
Dust, barring	June	248
End gate inside frunk	Apr	261
Escaping car troubles	May	174
Food k-t, fitted	Jenu	247
Futer, spore, the for	Peb	255
Gaseline, eight ways to		
1070	Jane.	216
Hoyling lymbar on cor	feb.	256
How to took by the road	Mey	148
Map board, lighted	May	173
Paper-lowel holder	Jon.	197
Roodside repairs, sons warn o	T Apr	261
Roodside wash-up kit	Apr.	171
Sleaping platform, station-		
wagan ,	Pelo.	220
Superhighways, map shows	May	166
Tools, ket for	May	248
Turn signals, improvised		
Upholslery, cor, plote gwards.	"Jon.	198
**************************************		_

AUTO ACCESSORIES

Hand strop, estra	253
Light warns of loose door Feb.	. 255
Endig, extra switch for Mar	. 253
Sool ight, mounting Mar	. 354
Trauble lightFeb	. 217

AUTO BODY CARE

Cor washing map, using May	246
Convertible, retopping. Apr.	161
Convertible top, fred ngApr.	165
Frazes nut, bypassing Mar-	
Headlight, tope subs as May	248
Meta plate goords upholstery Jon	198
Frassura lubricator May	
Toil I phts, Improving Mar	
Touthbrush cleans seams. Feb	256
Window, replacing Feb.	
Windshield, cleaning June	
Windshield, plastic strip goords Jan.	198

AUTO ENGINE CARE

Battery parts, treating .May	248
Corburator, holding on banch. Mor.	254
Distributor bushing, replacing Apr	262
Fan bells, replacing Feb.	256
Inner-tube sleeves guard arms Feb.	255
Muffler, (eaky, potching. May	248
Power brokes, installing. May	189

Radiator hase, Installing	Apr	261
Transmission, overhouting	June	248
Valve toppers odjusting	San,	
Yelfage regulator, insulating	Jon.	198

AUTO WHEELS AND TIRES

Air	in the	ft, bro	hou, s	wmoving	. June	246
Ch	ains, s	ramp i	telpy i	astold	Mer.	253
Ne	p cabi	, lock	ing in	place	Feb.	755
Pop	DOF TO	flects	leght (Hall He	Feb.	354
	ing-wh	eal su	it, Emi	proving.	Jun.	197
Y-gi	An-ca	e ram	aving	teol	Mor.	253
Ye	kyg-pig	m heli	der		May	246
W	totil g	heck,	celiap	sible	Jon.	197

B

Berbecup, He-con	June	191
Bedrings, tool removes	Apr	252
Beehive, moving	Mor	238
Bench, woodn wheels make.	Apr	172
Seach for child	Jan	210
Bench relis on wagon wheels.	May	234
Blueculers, how to buy	June	203
B and holes, ad frees bushings in	Jan	234
Blewforch as niter	May	

BOATS AND BOATING

Anchor, spring snop olds	Apr	221
Goot, load no in stat on wager		
Seet enyone can build.	Apr.	300
Dearstops protect boot	Mar	-
Dry dock for small boot	Muy	204
Kir boots, review of	Feb.	
Outboard filter top, improving		
Outboards, new, review of		
Paravane guards boot		
	June	220
Roils keep store boot	Mary	234
Sail mildew, avoiding	Moy	
dolla, cutting.	Apr	210
look ends for fishermon.	Mor	214
lookshelves, odjustable	feb.	203
bushengs, oit from	Jan.	234

C

Cabinet-door slides, making.	Mor.	248
Cabinet enit for bathroom.	Feb	251
Condisholder, making	Apr	213
Condinsticks from cons	Feb.	217
Cons, heverage, 9 uses for	Feb.	216
Canteen hate, sada locates.	May	179
Cord table, extension top for	Mar	201
Carrie, back-scrotcher for	June	181
Coment mozer, ford ports make		
Chair-arm table.	Fab.	227
Chamfers, homemade plane cu	ts. Peb.	246
Chisel blade, sharpening	Mor.	228
Chopping block, making	Mar	219
Chuck daubles as vise	Jon.	233
Clamp, corner braces make.	Apr.	256
Ciath fiber decorates cards	Apr	
Concrete wall, shalf for	Many	179

Countersinks, grinder smooths Credio for body, making.	Jos Apr.	
Craftsman corves fish.	Apr	199
Croftsman at work	Feb. 2	253,
Apr. 248, May 236,	June	244

CRAFTWORK

Ask Iroys.	Jon	236
Condishulder, moking	Apr	213
Chess set, making.	June	196
Clack planter	Jen	236
Drying aven from bucket	Joh	238
Gloss projects	Feb.	196
Intay sowdest and-coment	Apr.	224
Jawai bas	Jan	237
Crankcose oil, wick filters.	Jon	220
Crib parts make safe	Age.	186
Curto n rod makes rule	June	219
Culting board	June	216

8

Dade blode cuts tenony, Jan 202

DATA CARDS

Concrete block, drilling. Apr.	541
Pipe dimensions Jun	244
Wood flooring Fob	244
Wood preservatives, apply ng May	184
Wood preservatives, types of May	182
Desk, typing, how to make - Fob	226
Diving equipment, making June	143
Dody rolls on soft ground Apr.	182
Doer, slicking, how to avoid Apr.	209
Door mar, making . Apr	240
Dowel herps an arge small hole Jan	243
Dowel p.ns, hew to make Jan	333
Dowels 86 shot marks hares for Jon.	232
Dowe s pliers groups - Mar	212
Dawels, Jube cutter snips Apr	181
Drofting pencil, sharpaner for Mar.	212
Droins, hidden, locating	197
Bressing tobie, wall-type Apr.	
Bry dock for small bout May	204
- F	

DRILLS AND DRILLING

Attachment drives screws	Jes.	233
8.4s, fiputich comm hold	feb.	232
Cornidge cuts plugs	Apr.	250
Circle culter for dr () prets	feb.	249
Concrete black, dead on	Apr	181
Counterweight balances table		
Drill, kitchen uses for	June	278
Orall makes grove fly	May	179
Drift press, automatic switch		
for	Mor	250
Drife press punches hotes.	AVOC	223
Ord a pop-up case for	Apr	180
	Mura	234
Fly culter making	Mor	249
Hole cutter shapes mording	Mor	233
Lathe or drill, wring	Mor	246
Polishing with emery disk	čeb	246
Scribers test jig set up	ANDE	273
Speed reducer, homemode	Apr	240
Tab a holds long work	Feb.	329
Top and dri-is, cases for	Jon	234
Threading rods in drill press	Mar.	249
V-block fig speeds work	Mar	251
Drinking foundain, outdoor	June	190
Drying aven from bucket	Jan	738

E, 1

Electric miser bracket holds	Feb	233
Electric razor, sharpening	Mar	233
fon, bamboo	May	194
funce, wire makes pelproof	May	
Fence from blind slats	May	213
fences, decorative.	Apr.	224
File, handle for	Mar,	245
File tray, hisps weights paper	r III	
in .	Mar.	247
Fish hook, cork holds	May	196
Fishing built for, rubber covers	Mar.	248
Fishing roof, tuning up	Agr.	719
Fishing sinkers, Jubes make	AAA or	212
Floshlight, cl p holds	. May	173
Flashiight, sland up	Feb.	
Monible shafts, using	June	
Flexible (spe in sqw toble	Migr	240

Floor, pings mend holdt in Floor, spreading filler en	Fab		Hinggo, storing. Hinggo, stud locks	Feb.	725 248	t, J, K	
the state of the s	Fe's.		Hole, making small one larger			lek bottle, tin con holds	May 179
Fogging, treating glass for	Mar.	239	HOME MAINTENANCE			Intering with sewdust mesture.	
	Jan				102	inner tube makes door spring.	June 220
Pootstool	Jan.	210	Artic Jaweer, Installing Boby fonce, making	Apr		Inner-labe sleeves guard arms. Know rack.	Feb. 235
feetsteel stores firewood		_	Agreement light, mounting.	Jene		owing took.	140. 250
Fragen meet, thewise, and said	Jon.	275	Bosement well, sholf for a	May		A.	
Fraces nut, hyposting.			Bathroom cabinel well.	Peb.		-	
Funnel, leng shede at		202	Barhrob, rastalling. Bath, baduda	June	226	Ladder, boots hold	Feb 220
FUENITURE			Bench with sharoge space.			tome, bumboo covered	May 237
	44	210	Bird fooder, he consume	Feb.	244	Lamp, outdoor, calenial Lamp, planter type	May 174
Bonch with storage, space			Cord table, extension top for Cord table, storing.			Lomp, trick	June 219
Cabinet drawers, stant front			Cards decorated with Hiber	Apr	224	Lamps from driftwood	June 216
Cabinet handles, devels wal			Coder closel, fronting	lyne	190	Lamp is fish tunk	Apr. 198
Cabiner holds records,	Jan.		Coupout saver, moking	Mar	312	LATHE	
Cheir, relier-medu	Jen.		Child's snack bor				
Chair, putdoor, folding.	Mar.		Closet, swinging	MOY	213	Ball center for tapers Centerpunching lung stock	June 224 Jun. 234
Coffee tuble, Shopsmits				Feb Apr		Chuck orbor holds million	70P. 654
holida	Age.		Cinthesing, real for Cinthespine, who ingressing	.Apr		cultors	Apr 232
End table, making.	Mar.		Corres, Australias.	June		Cretismen builds lethe.	Feb 253 June 223
Free-form tuble Modern statigets	June.		Dog hoirs, roller picks up		310	Cult no rings Dry drnp hood	May 244
Pick of Salch, spolying		219	Door, sticking, how to evoid Doorball, perich silences.	Apr	179	Gloss disks, cutting	Feb. 193
Topluing theirs	May	213	Droinpipes, patching			Head vise used on fethe	Apr 254
7 & m stelps make glides		248	Drains, hidden, locating.	May	197	indexing draf fits spindle table as drift, using	Feb 250 Mor 246
Wrought-tran soft	Apr.	166	Electric author, author	Ney		Metal-turning	Jen. 222
			Electric outlets, wiring Floor equacks, eliminating	June		Milling attachment, mak-	
G			Gutters, streiners for	r	188	Motor cover prefects	Apr. 214 Jun 234
Garage clutter, convex hides	Jan	197	Home and grounds, 40 wa		995	Revelving center, making	
Corose daer, p pe holds.	Apr	262	te Improve Het dish wets, meking	Apr.		Surface gauge hards magnifi	
Gerope doors, decorative	Apr.		Heese marker	Mar	20P	Torleteck arbor guides tops Torleteck center, lubr cent fo	
Garbage hin for kirchen.	June	310	Irening, fell helps	Migr		Throad blind holes sofely	
GARDENS AND GARDENING			Kithen file drawer		214	Laundry homour, making	Apr 210
			Kitchen shelves, tilted	Feb	220	Lawn chair, building	June 210 May 198
Saby tractors reviewed. Grounds, ways to improve		725	Kitchen spice ruck		212	Laws mower, powering	Apr. 241
How to grow a Iron fust	Mer.	227	Krichen spice shelf Ladder, caller steedies		202	Loyout curves, clips haid	May 240
Knooling pad—tool carries			Levndry beg, bomper hooks	,		Lazy Susen, making Leather ounch, hinge makes	May 197 May 234
Lown edger, motorized,	Mar.	105	for	_	225	Lettersunches, guide for	Apr 254
town mower, locking makes			Lawn chair, paper city for		214	Light for clip board	Jan 192
town-mower roller, replacis	ц. Мау	214	Lineleum, leving Lineleum, sealing cracks in	_	224	Lighting, autdoor Linen cobinet, shutter door	May 224 feb 205
Lawn mawor, powering		241	Mirrory light dork route	Feb	220	Linesoum kn-fe, guerding	May 159
Midget tracter, building. New tools reviewed.	Mer.	174	Mixer bracket helds Oleo wrose mote handy covers		233	Lumber, worped, stra ghtenle-	
Partable gerden, making.	May	201	Overshoes, parking spot for	Asc.	210		
Seedlings, transplaating to		219	Ponty grossors, hook holds	May	100	M	
Sool gordening		181	Punts rock, folding		195		
	Apr	209	Paper-bog helder Picnic tuble, making	June	240	Magnets, how they work Marijna corns	Jan 186
Tools free! no		202	Pillows, dusting	Apr	2 0		Jan 120
Trottes making Utility truck making	Apr	246	Pipet, greaning eilenting		275	Mending plates, making	May 188
Vine supporting	June	189	Plant tube, making. Pot rock and se	May	245	Miler gewee stop motiving Milers, goupe measures	June 238 Feb 248
Wheelbarrow, tonvertible			Pump fleat plast c foam		1.04	Milets, Spalls Westerlas	144 244
Gates, decerative Gauge, surface holds magnife		213	Andient-hoot panel, vies	June,	222	MODEL MAKING	
Gouge for tool resetting	June	224	Corlings, making	Feb	203	Craftimen by Id car, boat	Feb 253
Goupa measures blind spaces		210	Razar rock, bathroom-cabine	4 Jon.	224	Madels blueprint highway.	5 Apr. 183
Class, buying, cutting, gia: traftwork		107	Re-covering chair arms			Steam-engine craftsman.	
Glass cutter plane, making	Feb	192	Tubber bulls, note for			Moterne, hole culter shopes. Moter sign, moking	June 202
Cluss-fiber mers, uses for		224	Scote, aluggish, Improving	Jon.	225	Motor for many tools	Apr. 166
Glasswore, rock drains Globe of world stand for	Apr		Screen door, brokes for				
Glave pieces mend tools	Mar	233	Shingles anchored by coppe		174	N, O, P	
Grender burned out, starting		220	Pobe	Jon.	193		
Or oder smouths counters his	,104	2.34	Steirs, chose warse of Stool detachable cover for		233	Halls, how they test Net best weeker acks	Apr. 174 June 224
OUS			Storage drawers, under-			Nul, topered pin lecks	Mor 249
-alds a hot-rad jeckey	Fab.	178	bed		247	Muti- identifying	Jen 218
-enswers a fire olors.	June,	194	Stave, spotter shoot for Sun and wind screens		209	Other follows' sheps	May 161, June 177
-clears a traffic jum -defice the elements		158	Swing, Impraving	June	190		
-dectors a case of the	Hapt.	100	Tape, 3 desen uses for		127	PAINT AND PAINTING	
(irraes		190	Trash-can bin dagproof Well festeners, all about		251	Aluminum-insulation stanci-	Anr. 240
—lands a band. Gelters, strainers for		140	Walts, now trisks for			Apron, disposable	Feb. 219
Seliate' litabuart uar	-may	190	building	Pob.		Eperment preparating test	May 2 4
H			Water tank, blatter centrals. Window barrel bolt lecks.		205	Booth wrop in fort	Jun 186 Feb 252
				June	189	Drill stics point?	Feb. 233
Hammer cushlans for line we			Window bezes, improving.		210	Orving oven from bucket	Jan. 238
Hammer handle, hambae Hardboard makes base for tild		233	Window rattle, stopping. Window screens, moking		186	Nelse in can rim save point Oircan makes touch up unit	
Hingus, come opart, lock for-			Yard bench ralls on wheels		234	Pickled finish, applying,	

Screens, easel for pointing.	June 189 Mor. 245 Feb. 218	Sowherses, making Veneered wood, sowing Scotfolds, portoble, making.	Apr., 256 Mor., 209 Feb., 203	Vise, mounting on bench. Terch, asbestos shipids.	Mor 2 Feb. 2
mail, making long points	Mor. 212 Jan. 186	Screens, moking	Jon. 225 June 242	TOYS	
spee jake, lock for	Jun. 100	Screens, sun and wind	June 199	Bin from bushet boshet	
HOTOGRAPHY		Screens, treating. Screensylver makes scening built	June 189 http://doi.	Poli s seesgw Dumbbell	Feb. 2
Adapter projects color reels	s Apr. 208	Screws, soop powder aids	Feb. 219	faner-tybe pool	June 1
Bolonce measures develope	r June 230	Shim books, how to make. Shingles, partable shelf for	Mor 212	Jock for toy cars Kid's stationary	Mor 1
Cameras, midget, raview	Apr. 194	Shoeshine stand, making	Mor 209	Musscal govrá	Feb. 2
Chamicals, bair drier warm	6. Feb. 210	Shapmenter swittpurpase tool	May 201	Play platform for back yard	June 1
Enlarging took, rocking Ferretype plates, rock for	Feb. 240	Shepsmith, new '54 model.	Apr. 176	Ruffer	Feb 2
Filler, screen holds	May 206		Apr. 237	Sandbox, screen bottom for Sensow	Apr 2 Feb. 2
Floodight, for temp		Smoker's stand, making.	Mer. 176	Steambeat whistle	Peb. 2
Movie film, tope can holds	Feb. 240	Snack bor for child. Snackel, making.	Apr 244 June 163	Swing, boolshing squeaks. Swing frame.	Jon. 2 Feb. 2
Photomicrographs, makin Photos, froming		Sockets, scrawdriver tures	Feb. 249	Tricycle, replacing thre	Jan I
Photoe, malling.	June 181	Soldering, steel wool helps. Solderine clamps, making	June 223	Tructor, midget, how to	Adam N
Rack drains glassware Stides stored in cigar bax		Soldering trumps, making		holid Tractors, boby, reviewed.	Mayr. 1
Wal-paper mokes bockdrap	Feb. 225	Saldering Iron, cipar wood for		Tracter for becycle	Mar 2
thup truck, improving thus truck, window quard fi	Apr 261	Soldering from works off botter	Feb. 245 v Jan. 193	Transmission, car, averbauling. Tray, plate-plass, making	June 2 Mar 2
cture frames, cutting milers		Splicing wire, pliers eld.	Apr 182	Tray becomes table tep.	Feb. 2
pa, building with	Feb. 201	Spring traces wavy line Steam-engine craftsman.	Mor. 246 Feb. 206	Tratis, making Truck for garden	Apr. 2
se-dimensions data cord se rock, moking	Jap. 244 Feb. 227	Stancia from aleminum.	Apr 240	Tubing block guides angle cut-	
ne blade shorpening	Mar 226	Stool, detechable cover for Stool, making	Feb. 219 May 206	Tubing from plastic-wire	Feb 2
ine culs chomfers enes, electric-pewer, mel	Fub. 246 k-	Stool legs, shortening	Feb. 248	Typewriter corries supplies.	Apr. 2
ing.	Fab. 234	Stave, spatter shield for Sungloises, tape improves.	Mar 209	Typewriter ribbon, changing	June 2
esterboord, hondring estering, all about	June 174 June 203	Surface gauge helds magnifier	Jon. 233	11 M 144	
notic looks like wrough	1	Swing, improving	June 190	u, v, w	
iren ers chuck onales	June 240 Apr 254	T		UHF television, questions	
ers improved for splicing.	Apr 182			ebeut	Jun. 13
ol, kid's, from inner tube rtable electric sews	June 176 June 182	Table, chair arm	Feb. 727	UHF TV convertor, making. Underwater-swimming goor	
wer angling, oil about	June 235	Table, free-form	Apr. 212	beilding	
wer brokes, installing	May 189	Table, picnic, from pipe. Table, picnic, wood	Feb. 203 June 206	Vocuum clooner makes pumi	n Apr. 2
wer mewer, hememede.	Apr. 241 Mar 248	Table, Shopsmith builds	Apr. 178	Yearen motor powers laws	Mer. 1
lleys orted by rope	Feb. 257	Teps, 3 denon uses for Telephone signd from plane	Jen. 187	Valve-cere removing tool	Mar 2
mp, vacuum cleaner make nen, spring, needs no homme		boock a secondarion	Feb. 220	V-b ock sig speeds drilling Wall festeners, all about	Mar 2
sh breom handle, lecking	Feb. 205	Telephone table-stysi	Mor. 246	Walls, new tricks for build- ing	
		TELEVISION		Wastebasket, making Water task, blotter shuts off	Mor 2 Apr 2
		Antenna, plastic hase takes.		Weider, tractor drives.	.Feb. 2
diant-hoot panel, uses fo	r Jen. 221	Antenna guys, silencing Sumpers protect wires	Apr. 211 Mor. 210	Western ways to home im-	t.Apr 2
DIO		Lomp	Joe, 237	provement	
		Lead-In hides in well		Wheel chock, enflopsible.	Jan 1
	Mar. 220		100 /46		
Amplifler, hi-fl, building. Mug-in ports build 24		Lightning accester, protecting Remete volume-control		Wheelbarrow, convertible Window screens, painting	Apr 2 Feb. 2
Amplifler, hi-fl, building. Mug-in parts build 24 radios	.Jan. 209	Lightning accester, prefecting Remote volume-control unit	May 216	Window screens, pointing Window screens, treating.	Apr 2 Peb. 2 June 1
Amplifier, hi-fi, building. Mug-in parts build 24 radios	Mar. 247	Lightning acceptor, prefecting Remete volume-control unit Rod extends lead in standof Set built into well	May 216 Feb. 240 Mer, 190	Window screens, pointing Window screens, treating. Windows and window wall building	Apr 2 Peb. 2 June 1 June 1
Amplifier, hi-fi, building. Mug-in parts build 24 redice	Mar 247 Feb. 203	Lightning acceptor, prefecting Remete volume-control unit Rod extends lead-in standof Set built late well Set on pivor faces 3 ways	May 216 Feb. 240 Mer. 190 Apr. 181	Window screens, pointing Window screens, treating. Windows and window wall building. Weed, streightening warp.	Apr 2 feb. 2 jine t s, Feb. 1 Jan, 1
Amplifier, hi-fi, huliding Mug-in parts hulid 24 redice	Mor. 247 Peb. 203 Mor. 233 Apr. 209	Lightning acceptor, prefecting Remete volume-control unit Rod extends lead in standof Set built into well	May 216 Feb. 240 Mer. 190 Apr. 181	Window screens, pointing Window screens, treating. Windows and window wall building. Wood, streightening warp. Wood, veneered, sowing.	Apr 2 Peb. 2 June 1 Is, Peb. 1 Jan, 1 Mur 2
Amplifier, hi-fi, huliding Mug-in parts hulid 34 redice	Mar. 247 Feb. 203 Mor. 233 Apr. 209 June 194	Lightning acceptor, protecting Remote volume-control unit flod extends lead in standoff Set built into well Set on pivot faces 3 ways Util, automore to questions about Util convertor, making.	May 216 Feb. 240 Mer. 190 Apr. 181 Jan. 177 Feb. 221	Window screens, pointing Window screens, treating. Windows and window wall building. Weed, streightening warp. Wood, veneered, sawing. Wood flooring, new types of Wood paneling, all about.	Apr 2 Peb. 2 June 1 Is, Peb. 1 Jan, 1 Mur 2
Implifier, hi-fl, huliding. Hug-in parts hulid 34 redies Free O plantes tim pilot I phis Imps, making Free, electric, skarpening. Free ands, quarding bluer balls, uses for e, steel, improving	Mor. 247 Peb. 203 Mor. 233 Apr. 209	Lightning acceptor, protecting Remote volume-control unit flod extends lead in standoff Set built into well Set on pivot faces 3 ways UHF, national to questions obout UHF convertor, making. Tent stakes, securing.	May 216 Feb. 240 Mer. 190 Apr. 181 Jan. 177	Window screens, pointing Window screens, treating. Windows and window wall building. Weed, straightening warp. Wood, veneral, sowing. Wood flooring, new types of Wood paneling, all about Wood preservatives, all	Apr 2 Peb. 2 Jine 1 Jan, 1 Jan, 1 Mur 2 Feb. 2 Mer. 3
Amplifier, hi-fl, huliding Hug-in parts hulid 34 redies Ares O plantes tim pilot I phis lings, making tor, electric, skarpening. pe ands, quarding blue balls, uses for e, steel, improving	Mor. 247 Peb. 203 Mor. 233 Apr. 209 June 194 Feb. 225;	Lightning acceptor, protecting Remote volume-control unit flod extends lead in standoff Set built into well. Set on pivot faces 3 ways UHF, masswers to questions about UHF convertor, making. Testerbuil, making set, playing	May 216 Feb. 240 Mer, 190 Apr. 181 Jan. 177 Feb. 221 June 220 Mer, 230	Window screens, pointing Window screens, treating. Windows and window wall building. Weed, straightening warp Wood, veneered, sawing Wood flooring, new types of Wood paneling, all about Wood preservatives, all about Wordless Workshop.	Apr 2 Peb. 2 Jene 1 Jan, 1 Jan, 1 Mar 2 Mar, 2 May 1 Jen. 21
Amplifier, hi-fl, huliding Hug-in parts hulid 34 redies Ares O plantes tim pilot I phis lings, making tor, electric, skarpening. pe ands, quarding blue balls, uses for e, steel, improving	Mor. 247 Peb. 203 Mor. 233 Apr. 209 June 194 Feb. 225; May 16	Lightning acceptor, protecting Remote volume-control unit flad extends lead in standoff Set built into well. Set on pivot faces 3 ways UHF, masswors to questions about UHF convertor, making. Testaches, securing. Testaches, securing. Testaches, securing set, playing. Three-D viewers, improving	May 216 Feb. 240 Mer. 190 Apr. 181 Jan. 177 Feb. 221 June 220	Window screens, pointing Window screens, treating. Windows and window wall building. Weed, straightening warp. Wood, veneered, sawing. Wood flooring, new types of Wood paneling, all about Wood preservatives, all about Wordless Workshop. Feb. 178, Mar. 178, 1	Apr 2 Peb. 2 Jine 1 Jan, 1 Jan, 1 Mar 2 Mer. 2 May 1
Amplifier, hi-fi, huliding Hug-in parts hulid 34 redies Free O plantes tim pilot I phis lings, making ror, electric, skarpening. pe ands, quarding blue balls, uses for e, steel, improving	Mor. 247 Peb. 203 Mor. 233 Apr. 209 June 194 Feb. 225; May 16	Remote volume-control unit Rod extends lead in standoft Set built into well Set on pivot faces 3 ways UHF, maswers to questions about UHF convertor, making. Testorball, making set, playing Three D viewers, improving Tites, hardboard bese for Toggle bolf, substitute for	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mer. 230 Feb. 233 Mor. 240 May 251	Window screens, pointing Window screens, treating. Windows and window wall building. Weed, straightening warp Wood, veneered, sawing Wood flooring, new types of Wood paneling, all about Wood preservatives, all about Wordless Workshop.	Apr 2 Peb. 2 Jene 1 Jan, 1 Jan, 1 Mar 2 Mar, 2 May 1 Jen. 21
Amplifier, hi-fi, huliding. Hug-in parts build 34 redies with pilot in pilot in pilot ings, making a ror, electric, sharpening, pe ands, quarding blac balls, was for e, steel, improving etter about to serves as equare.	Mor. 247 Peb. 203 Mor. 233 Apr. 209 June 194 Feb. 225; May 16	Lightning acceptor, protecting Remote volume-control unit flad extends lead in standoff Set built into well. Set on pivot faces 3 ways UHF, maxwers to questions about UHF convertor, making. Tent stakes, securing. Tetherboth, making set, playing: Three D viewers, impraving thes, herdboard bese for	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mar. 230 Feb. 233 Mor. 240	Window screens, pointing Window screens, treating. Windows and window wall building Wood, straightening warp Wood, venerad, sawing Wood flooring, new types of Wood penaling, all about Wood preservatives, all about Wordless Workshop. Feb. 172, Mar. 175, May 186, June 208 Workbeach, making.	Apr 2 Peb. 2 Jene 1 Jan, 1 Jan, 1 Mar 2 May 1 May 1 Jen. 21 Apr. 16
Implifier, hi-fl, building. Hug-in parts build 34 realise	Mar. 247 Feb. 203 Mor. 233 Apr. 209 Jone 194 Feb. 225; May 16 Jon. 212 Feb. 217 Jan. 202	Remote volume-control unit Rod extends lead in standoft Set built into well Set on pivot faces 3 ways UHF, maswers to questions about UHF convertor, making. Testorball, making set, playing Three D viewers, improving Tites, hardboard bese for Toggle bolf, substitute for	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mer. 230 Feb. 233 Mor. 240 May 251	Window screens, pointing Window screens, treating. Windows and window wall building Wood, straightening warp Wood, venerad, sawing Wood flooring, new types of Wood peneling, all about Wood preservatives, all about Wordless Workshop. Feb. 172, Mar. 175, May 156, June 208 Workshop AISS	Apr 2 Feb. 2 Jan. 1 Jan. 1 Har. 2 Feb. 2 May 1 Jan. 21 Apr. 16
Amplifier, hi-fi, huliding. Hug-in parts build 34 realise and pilot free O plantes at m pilot i phis lings, making a propening, pe ands, quarding black balls, was for e, steel, improving etter about to server as aquate. I shaker for picnic adea belts, tapa contets. I shaker for picnic adea belts, tapa contets.	Mar. 247 Feb. 203 Mor. 233 Apr. 209 Jone 194 Feb. 225; May 16 Jon. 212	Lightning acceptor, protecting Remote volume-control unit Rod extends lead in standoft Set built lists well Set on pivor faces 3 ways UNIF, maswers to questions obout UNIF convertor, making. Teststakes, securing. Teststakes, securing. Teststakes, making set, playing Three D viewers, improving Tites, hardboard base for Taggle boilt, substitute for Tag strips as slides. TOOLS	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mer. 230 Feb. 233 Mer. 240 Mer. 251 Mer. 248	Window screens, pointing Window screens, treating. Windows and window wall building Wood, straightening worp Wood, veneered, sowing Wood flooring, new types of Wood peneling, all about Wood preservatives, all about Workless Workshop. Feb. 192, Mar. 196, May 166, June 208 Workshop Aids Botts, cutting	Apr 2 Feb. 2 Jan. 1 Jan. 1 Har. 2 Feb. 2 May 1 Jan. 21 Apr. 16
Amplifier, hi-fi, huliding. Hug-in parts build 34 realise have dim pilot ly his lings, making a rea, electric, sharpening. pe ands, quarding blace balls, was for e, steel, improving etter about le serves as square. I shaker for picnic ader belts, tapa contess. Inding black. Inding disks, cutting	Mar. 247 Feb. 203 Mor. 233 Apr. 209 Jone 194 Feb. 225; May 16 Jon. 212 Feb. 217 Jan. 202 June 198	Lightning acceptor, protecting Remote volume-control unit Rod extends lead in standoft Set built lists well Set on pivor faces 3 ways Util, maswers to questions obout Util convertor, making. Teststakes, securing. Teststakes, securing. Teststakes, making set, playing Three D viewers, improving Tites, hardboard base for Taggle boilt, substitute for Tag strips as slides.	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 223 June 220 Mer. 230 Feb. 233 Mor 240 Mor 241 Mor 248	Window screens, pointing Window screens, treating. Windows and window wall building Wood, straightening worp Wood, venered, sowing Wood flooring, new types of Wood peneling, all about Wood preservatives, all about Wordless Workshop. Feb. 172, Mar. 175, May 156, June 208 Workbeach, making. WORKSHOP AISS Botts, cutting	Apr 2 Feb. 2 Jan. 1 Jan. 1 Jan. 2 Feb. 2 May 1 Jan. 21 Apr. 16 Feb. 2
Amplifier, hi-fi, huliding. Hug-in parts build 34 realize have dim pilot lings, making a ror, electric, sharpening. pe ands, quarding blace balls, wass for etter ebout le server as square. I shaker for picnic adea belts, topa conters. ading black. ading disks, cutting adpaper, using.	Mar. 247 Peb. 203 Mor. 233 Apr. 209 Jone 194 Feb. 225; May 16 Jon. 212 Feb. 217 Jan. 202 June 198 Mer. 238	Lightning acceptor, protecting Remote volume-control wait Rod extends lead in standard Set built late well. Set on pivot faces 3 ways util, maxwers to questions obsert Little convertor, making. Tent stakes, securing. Tetterbuil, making set, playing. Three D viewers, improving tites, hardboard base for Toggle ball, substitute for T & g strips as slides. TOOLS Cake pas is tool halder	May 216 Feb. 240 Mer. 190 Apr. 181 Jun. 177 Feb. 223 June 220 Mar. 230 Fab. 233 Mar 240 Mar 241 Mar 248	Window screens, pointing Windows screens, treating. Windows and window wall building Wood, straightening worp Wood, venerad, sowing Wood peneling, all about Wood peneling, all about Wood preservatives, all about Wordless Workshop. Feb. 198, Mar. 198, May 188, June 208 Werkbeach, making. WORKSHOP AISS Botts, cutting Cake pan holds tools. Camp, corner broces make. Clips hold tayout curves.	Apr 2 Feb. 2 Jan. 1 Jan. 1 Jan. 2 Feb. 2 May 1 Jen. 21 Apr. 16 Feb. 2 Apr. 2 Apr. 2
Implifier, hi-fl, huliding. Hug-in parts build 34 redies r	Mar 247 Peb. 203 Mor. 233 Apr. 209 June 194 Feb. 225; May 16 Jun. 212 Feb. 217 Jun. 202 June 198 Mor. 238 June 176	Lightning acceptor, protecting Remote volume-control unit Red extends lead in standoft Set built lists well Set on pivot faces 3 ways Littly maswers to questions obsert Littl convertor, making. Tent stakes, securing. Tetterbuilt, making set, playing Three D viewers, improving Tites, hordboard base for Toggle bolt, substitute for The strips as slides. TOOLS Cake pas is tool halder	May 216 Feb. 240 Mer. 190 Apr. 181 Jun. 177 Feb. 223 June 220 Mar. 230 Fab. 233 Mar 240 Mar 241 Mar 248	Window screens, pointing Window screens, treating. Windows and window wall building Wood, straightening warp Wood, venerad, saving Wood flooring, new types of Wood peneling, all shout Wood preparvatives, all about Wordless Workshop. Feb. 192, Mar. 196, May 186, June 208 Werkbeach, making. WORKSHOP AIDS Botts, cutting Coke pan holds tools. Ciamp, corner broces make. Clips hold tayout curves. Cips hold papers Corregated reofing holds	Apr 2 Feb. 2 Jan, 1 Jan, 1 Jan, 2 Mer. 2 Mer. 2 Mey 1 Jen. 21 Apr. 16 Feb. 2 Apr. 2 Apr. 2 June 2 Apr. 2 June 2 June 2 June 2 June 2
Amplifier, hi-fi, huliding. Hug-in parts build 34 redies redies Tree O planes sim pital lings, making ror, electric, sharpening. ro ends, quarding bluer bells, was for exter ebout to server as equare. I shaker for picalc ader belts, hape contest. ading block. ading disks, cutting adpaper, wing. WE AND SAWING	Mar. 247 Feb. 203 Mor. 233 Apr. 209 June 194 Feb. 225; May 16 Jun. 212 Feb. 217 June 198 Mor. 238 June 176 Feb. 245 June 182	Lightning acceptor, protecting Remote volume-control wolf. Rod extends lead in standoff Set built late well. Set on pivot faces 3 ways Util, maxwers to questions obsert. Util converter, making set, playing. Tetterbuil, making set, playing. Three D viewers, improving tites, herdboard base for Togale ball, substitute for T & g strips as slides. TOOLS Coke pas is tool halder	May 216 Feb. 240 Mer. 190 Apr. 181 Jun. 177 Feb. 223 June 220 Mar. 230 Fab. 233 Mar 240 Mar 241 Mar 248 June 219 June 219 June 220	Window screens, pointing Window screens, treating Windows and window wall building Wood, straightening warp Wood, venerad, saving Wood flooring, new types of Wood peneling, all shout Wood preservatives, all about Wordless Workshop. Fab. 192, Mar. 198, May 188, June 208 Workboach, making. Workshop Alss Bots, cutting Coke pan holds tools. Ciamp, corner broces make. Cips hold tayout curves. Cips hold tayout curves. Cips hold papers Corregated roofing holds shelves. Curtain rods as small drawers.	Apr 2 June 1 June 1 June 1 June 2 May 1 June 2 Apr 2 June 2 Apr 2 June 2
Amplifier, hi-fi, huliding. Hug-in parts build 34 redies r	Mar 247 Peb. 203 Mor. 233 Apr 209 June 194 Feb 225; May 16 June 198 Mor. 238 June 176 Feb. 245 June 176 Feb. 245 June 182 le Mor. 240	Lightning acceptor, protecting Remote volume-control and food autends lead in standoff Set built late well Set on pivot faces 3 ways Util, maxwers to questions obsert little convertor, making set, playing Tetherbuil, making set, playing Three D viewers, improving Tites, herdboard base for Togale bair, substitute for T & g strips as slides. TOOLS Coke pas is tool halder	May 216 Feb. 240 Mer. 190 Apr. 181 Jun. 177 Feb. 223 June 220 Mar. 230 Fab. 233 Mor 240 Mar 251 Mor 248 June 219 June 219 June 220 Jun. 234 Apr. 146	Window screens, pointing Window screens, treating Windows and window wall building Wood, straightening warp Wood, venered, saving Wood flooring, new types of Wood paneling, all shout Wood preparvatives, all about Wordless Workshop. Fab. 192, Mar. 198, May 188, June 208 Workboach, making. Workshop Alss Bots, cutting Cake pan holds tools. Ciamp, corner broces make. Cipe hold tayout curves. Cipe hold tayout curves. Cipe hold papers Corregated roofing holds shelves. Curtain rods as shall drawers. Funnel, lamp shade as	Apr 2 June 1 June 1 June 1 June 2 May 1 June 2 Apr 2 June 2 Apr 2 June 2 June 2 June 2 June 2 June 2
Implifier, hi-fl, huliding. Hug-in parts build 34 redies Free O plantes the pilot I phis lings, making for, electric, tharpening. po ends, quarding blue balls, was for e, steel, improving etter ebout to serves as square. I shaker for picnic ader belts, tapa contess. ading block. ading block. ading disks, cutting idpaper, wing. WE AND SAWING landsow tires, replacing flectric sows, portable lexible tapa inlaid in tabilacksowing tips	Mar. 247 Feb. 203 Mor. 233 Apr. 209 June 194 Feb. 225; May 16 Jun. 212 Feb. 217 June 198 Mor. 238 June 176 Feb. 245 June 182	Lightning acceptor, protecting Remote volume-control wolf. Rod extends lead in standoff Set built late well. Set on pivot faces 3 ways Util, maxwers to questions obsert. Util converter, making set, playing. Tetterbuil, making set, playing. Three D viewers, improving tites, herdboard base for Togale ball, substitute for T & g strips as slides. TOOLS Coke pas is tool halder	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 223 June 220 Mar. 230 Feb. 233 Mor 240 May 251 Mor 248 June 219 June 219 June 220 Jon. 234	Window screens, pointing Window screens, treating Windows and window wall building Wood, straightening warp Wood, venerad, saving Wood flooring, new types of Wood peneling, all shout Wood preservatives, all about Wordless Workshop. Fab. 192, Mar. 198, May 188, June 208 Workboach, making. Workshop Alss Bots, cutting Coke pan holds tools. Ciamp, corner broces make. Cips hold tayout curves. Cips hold tayout curves. Cips hold papers Corregated roofing holds shelves. Curtain rods as small drawers.	Apr 2 June 1 June 1 June 1 June 2 May 1 June 2 Apr 2 June 2 Apr 2 June 2
Amplifler, hi-fi, huliding. Mug-in parts build 34 redies Pares O plantes of m pilot I phis lings, making a ror, electric, sharpening. pe ands, quarding blue balls, uses for re, steel, improving etter ebout le serves as equare. If shaker for picnic adre belts, tapa conters. adreg block. adreg bl	Mar 247 Pab. 203 Mar. 233 Apr. 209 June 194 Fab. 225; May 16 June 198 Mar. 202 June 198 Mar. 238 June 176 Fab. 245 June 176 Fab. 245 June 176 Fab. 245 June 238 June 238 June 238	Lightning acceptor, protecting Remote volume-control and the standoff set built into well. Set an pivot faces 3 ways utill, seawars to questions obsert with convertor, making. Tent stakes, securing. Tentstakes, securing. Tenterbull, making set, playing. Tites, herdboard bese for Togale balt, substitute for T & g strips as slides. TOOLS Coke pee in tool haider	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mer. 230 Feb. 233 Mor 240 Mer. 251 Mor 248 June 219 Amr. 234 June 220 Jon. 234 Apr. 146 Peb. 234 June 122 Feb 220	Window screens, pointing Window screens, treating Windows and window wall building Wood, straightening warp Wood, venerad, saving Wood flooring, new types of Wood peneling, all shout Wood preservatives, all about Wordless Workshop. Fab. 172, Mar. 176, May 186, June 208 Workboach, making. WORKSHOP AISS Bots, cutting Coke pan holds tools. Ciamp, corner broces make. Cips hold layout durins. Cips hold layout durins. Cips hold layout durins. Cips hold layout durins. Cips hold papers. Corregated reafing holds shelves Curtain rots as small drawers. Funnel, lamp shade as Hommer heliter for boft Miter puide, emergency Shan books have maky uses.	Apr 2 Feb. 2 Jan, 1 Jan, 2 Feb. 2 May 1 Jan, 21 Apr. 21 Apr. 10 Feb. 2 Apr. 2 June 2 Apr. 2 June 2 June 2 June 2 June 2 June 2 June 3 Mar. 2 Mar. 2 Mar. 2 Mar. 1
Amplifler, hi-fi, heliding. Mug-in parts build 34 radios Parts O plantes the pilot I phis lings, making a ror, electric, therpening, pe ands, quarding blue balls, uses for le serves as square. It shaker for picnic adre belts, tapa conters, adreg block, adreg block, adreg block, adreg block, adreg block, adreg block, adreg block le serves as square. WS AND SAWING Londsow tires, replacing Electric saws, pertable lexible tapa lalaid in tab lexible tapa stop, making Outrippers hald his panel	Mar. 247 Pab. 203 Mar. 233 Apr. 209 June 194 Fab. 225; May 16 June 198 Mar. 202 June 198 Mar. 238 June 176 Fab. 245 June 176 Fab. 245 June 176 Fab. 245 June 238	Lightning acceptor, protecting Remote volume-control and the standoff set built fate well. Set an pivot faces 3 ways utill, maxwers to questions obsert with converter, making. Tent stakes, securing. Tenterbuil, making set, playing three D viewers, improving three D viewers, improving thes, herdboard bese for Tagele balt, substitute for Tagele balt, starting Meda, pewer-tool, sever guards One conter runs formy reads form, making Pertuble electric sews. Rock for small tools. Rest, cleaning off maximum.	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mer. 230 Feb. 233 Mor 240 Mer. 251 Mor 248 June 219 Apr. 146 Peb. 234 June 122 Feb 220 June 238	Window screens, pointing Window screens, treating. Whedows and window wall building Wood, straightening warp Wood, venerad, saving Wood flooring, new types of Wood peneting, all shout Wood preservatives, all about Wordless Workshop. Fab. 172, Mar. 176, May 186, June 208 Workbonch, making. Workshop Alss Bots, cutting Coke pan holds tools. Comp, corner broces make. Cipa hold layout durins. Cipa hold layout durins. Cipa hold layout durins. Cipa hold layout durins. Corregated reafing holds shelves Curtain rots as small drawers. Funnel, lamp shade as Hommer heliter for boft Miter puide, emergency Shan books have maky uses. Small tools, suck for.	Apr 2 Feb. 2 Jan, 1 Jan, 2 Feb. 2 May 1 Jan, 21 May 1 Jan, 21 Apr. 10 Apr. 2 Apr. 2 Jane 2 Apr. 2 Jane 2 Ja
Amplifler, hi-fi, heliding. Mug-in parts build 34 redice Parts O plantes the pilot i phis lings, making a ror, electric, therpening. pe ends, quarding blace balls, uses for e, steel, improving etter ebout le serves as thudth. It shaker for picnic adre belts, tapa contets. adreg block. a	Mar. 247 Peb. 203 Mor. 233 Apr. 209 June 199 Feb. 225; May 16 Jun. 212 Feb. 217 Jun. 202 June 198 Mor. 238 June 176 Feb. 245 June 176 Feb. 245 June 176 June 238	Lightning acceptor, protecting Remote volume-control unit Rod extends lead in standari Set built late well Set on pivor faces 3 ways Utilit convertor, making. Utilit convertor, making. Testockes, securing. Testockes, securing. Testockes, securing. Testockes, securing. Testockes, securing. Total viewers, improving fites, herdboard base for Toggle balt, substitute for T & g strips as slides. TOOLS Coke pas is tool haider	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mer. 230 Feb. 233 Mor 240 Mer. 251 Mor 248 June 219 Apr. 146 Peb. 234 June 234 June 234 June 122 Feb 220 June 238 May 208	Window screens, pointing Window screens, treating. Windows and window wall building Wood, straightening warp Wood, venerad, saving Wood paneling, all about Wood preservatives, all about Wordless Workshop. Feb. 172, Mar. 175, May 186, June 208 Workshop Alas Botts, cutting Cake pan holds tools. Camp, corner broces make. Cips hold tayout curves. Corregated reofing holds shalves. Corregated reofing holds shalves. Corregated reofing holds shalves make uses. Sochut driver, making. Torque angileg.	Apr 2 June 1 Jun, 1 Jun, 2 June 2 May 1 Jun, 21 Apr. 10 Apr. 2 June 2 Mar. 2 Mar. 2 June 2 Mar. 2 May 3 May 4 Ma
Amplifler, hi-fi, heliding. Plug-in parts helid 24 redies redies Pares O plantes d'm pilot i phis ilings, making a ror, electric, tharpening. pe ands, quarding blace helis, was fer re, steel, improving etter ebout le serves as square. It shaker for picnic nder belts, tape centers. Inding block adrage block adrage block adrage block reding block le serves as square. WE AND SAWING Londsow tires, replacing Electric saws, pertable lexible tape lalaid is table lexible tape lalaid in table lexible tape stop, making Outrippers hald his panel lexible saw, jis for	Mar. 247 Peb. 203 Mor. 233 Apr. 209 Jone 194 Feb. 225; May 16 Jon. 212 Feb. 217 Jon. 202 June 198 Mor. 238 June 176 Feb. 245 June 176 Feb. 245 June 176 Mor. 250 Abor. 250 Abor. 250 Abor. 250 Abor. 238 June 238	Lightning acceptor, protecting Remote volume-control unit Rod extends lead in standari Set built late well Set on pivor faces 3 ways Utilit convertor, making. Utilit convertor, making. Testechell, making set, playing Three D viewers, improving Tites, herdboard base for Tagele balt, substitute for Tag strips as slides. TOOLS Coke pas is tool haider	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mer. 230 Feb. 233 Mor 240 Mor 251 Mor 248 June 220 June 220 June 234 Apr. 146 June 122 Feb. 234 June 122 Feb. 234 June 123 June 238	Window screens, pointing Window screens, treating. Windows and window wall building Weed, streightening warp Wood, venerad, saving Wood peneting, new types of Wood peneting, all about Wood preservatives, all about Wordless Workshop. Feb. 172, Mar. 175, May 156, June 208 Workbeach, making. Workshop Alss Bots, cutting Coke pan holds tools. Cramp, corner broces make. Clips hold tayout curves. Cips hold tayout curves. Corregated reofing holds shalves.	Apr 2 June 1 Jun, 1 Jun, 2 June 2 May 1 Jun, 21 Apr. 2 Apr. 2 June 2 June 2 June 2 June 2 June 2 June 2 Mar, 2 Mar, 2 Mar, 2 June 2 Mar, 2 Mar
Amplifler, hi-fi, heliding. Plug-in parts helid 24 redies redies Three O plantes of m pilot I phis lings, making a ror, electric, therpening. pe ends, quarding bluer helis, was fer re, steel, improving letter ebout le serves as square. If shaker for picnic nder belts, tape centers. Inding block adag block adag block adag block redies square Register saws, pertable Plexible tope lelaid in tab ligsaw blades, rock for Witer-gouge stop, making Outrippers held his panel Portable saw, 118 for Prening blade, saw used as	Mar. 247 Peb. 203 Mor. 233 Apr. 209 Jone 194 Feb. 225; Mary 16 Jun. 212 Feb. 217 Jun. 202 June 198 Mor. 238 June 176 Feb. 245 June 176 Feb. 245 June 238	Lightning acceptor, protecting Remote volume-control unit Rod extends lead in standari Set built late well Set on pivor faces 3 ways Utilit convertor, making. Utilit convertor, making. Testockes, securing. Testockes, securing. Testockes, securing. Testockes, securing. Testockes, securing. Total viewers, improving fites, herdboard base for Toggle balt, substitute for T & g strips as slides. TOOLS Coke pas is tool haider	May 216 Feb. 240 Mer. 190 Apr. 181 Jen. 177 Feb. 221 June 220 Mer. 230 Feb. 233 Mor 240 Mer. 251 Mor 248 June 220 Jon. 234 Apr. 146 June 122 Feb. 224 June 122 Feb. 234 June 123 Feb. 234 June 238 Feb. 230 June 238 Feb. 234 June 238 Feb. 237 Feb. 234 June 238 Feb. 234 June 238 Feb. 238 Feb. 234 June 238 Feb. 234 June 238 Feb. 238 Feb. 234 June 238 Feb. 234 June 238 Feb. 238 Feb. 238 Feb. 234 June 238 Feb. 238 Feb. 238 Feb. 234 June 238 Feb. 238 Feb. 238 Feb. 238 Feb. 234 Feb. 238 Feb.	Window screens, pointing Window screens, treating. Windows and window wall building Wood, straightening warp Wood venered, saving Wood peneting, all about Wood preservatives, all about Wordless Workshop. Feb. 198, Mar. 198, May 188, June 208 Workbosch, making. Workbosch, making. Workshop Alss Botts, cutting Coke pan holds tools. Comp, corner broces make. Cips hold layout curves. Cips hold layout curves. Cips hold layout curves. Corregated reading holds shalves. Curtain rods as shall drawers. Funnel, lamp shade as Hommer helyter for beft Miter puide, emergency Shire books have make uses. Small tools, suck for. Socket driver, making. Torque angileg. Yise, chuck doubles as Vise, mounting on beach Wreack holder	Apr 2 June 1 Jun, 1 Jun, 2 June 2 May 1 Jun, 21 Apr. 2 Apr. 2 June 2 June 2 June 2 June 2 June 2 June 2 Mar, 2 Mar, 2 Mar, 2 June 2 Mar, 2 Mar

[Continued from page 92]

in a 1934. Some of the owners with stanch beliefs in Franklins are women, including Mrs. Marjorie M. Andrew of Lonsdale, R. I. Mrs. Andrew has a 1904, a 1929 and a 1931, all operating.

Amick works in a building-and-loan office, refers to himself as "a pencil-pusher," and bought his '05 in the first place to find something different to do

outside office hours.

Even a Watchmaker Worked on It

He kept a list of everything he had to do, or had to get someone to do, as he restored the car, and that's where he discovered he had to go into 21 different trades before the job was done. Besides (1) sandblasting, (2) carpentry and (3) cabinetmaking, there were (4) auto mechanics, (5) machinist's work on the differential, transmission and elsewhere, (6) electroplating brass and nickel trim, and operating controls, (7) watchmaking-he had to get a watchmaker's help to fasten small wires to the timer, (8) plastics, to make dummy heads for the coils, (9) gunsmithing, to glue parts and make small springs, (10) upholstering-on cushions, and to make the snap-on tire cover for the spare, (11) aluminum welding-body and many parts are aluminum.

An air-cooled Franklin has no radiator, but it does have a lot of metal to clean and solder. Amick discovered that radiator repairmen (12) were the best at this of anyone, and got their aid. Repairing locks on the toolbox and on a compartment under the seat, he worked as a locksmith (13). Bouncing out bumps in his mudguards (fenders), he became a dinger (14), a trade name for the man who smooths out dents and

bumps.

He became a leather worker (15) as he went over the seats 100 times with neat's-foot oil and saddle soap to soften them and make them like new. He supervised 18 to 20 coats of paint (16). He polished one thousand brass openings in the grille (17). Rewiring the car,

he became a general auto electrician (18). In the process, he was able to buy some cable identical with that installed in the original 1905 Franklins. He got it from the same company that made it then.

Car Was Hauled from Elmira, N.Y.

He had to be a typist (19) to write the dozens of letters that were necessary to locate the car in the first place. Once he had the car, he became a trucker or transporter of heavy stuff (20). He had to move it by tractor-trailer and truck from Elmira, N. Y., to Maryland.

"Finding the right man to do a job," he says, "was often the biggest problem." Despite the help he obtained, Amick estimates that he did over three-quarters

of the work himself.

Finding the right parts, in junk yards, auto-parts shops, or wherever, was also a problem. To do it, Amick got into photography (21). To show parts dealers and others exactly what he required, Amick took pictures of his old, beat-up parts—a hub cap and lamps, for instance—and circulated the photos. Eventually, he got everything he needed.

Of the photograph showing the unrestored car (page 93), Amick says today, "Unfortunately, the picture flatters it." Of his restoration job as a whole, he says, "Everywhere you looked you had problems, But I've seen a lot worse reconstruction jobs. One man rebuilt a car, for instance, by picking up parts that had been lying out in a field for 20 years."

Amick's enthusiasm for restorations, and for air-cooled cars, has not been lessened by his difficulties. He has just purchased, and is starting to restore, another Franklin—this time a 1912 Torpedo Phaeton.

Sha's Defended

Woman to husband: "I scratched the front fender a bitle, dear. If you want to look at it, it's in the back scat,"—L & N Magazine.



WINGED performance for your car



There is an AC Spark
Plug engineered to
General Motors standards for your car
These famous Spark
Plugs bring you the
power-boosting, gassaving advantages of
AC self-cleaning
patented insulation.





Every gailon of gasoline you use must be fed steadily, dependably, efficiently to your engine's carburetor if your fuel pump is several seasons old it is wise to replace with a new AC Fuel Pump. Keep your engine full of life — smooth and responsive, powerful and economical! Have your oil filter changed regularly, every 4,000 to 6,000 miles, and be sure you get a genuine AC Oil Filter each time you make this important change.

Briefly — here are some of the benefits you get when you protect your engine with an AC Oil Filter. The clean oil you buy is kept clean. Every tiny particle of dirt, grit, metal is filtered out — trapped so it cannot injure the close-fitting parts that make a modern engine efficient and quiet. Full, clean-oil lubrication is furnished all the time, not just when oil is freshly changed. Have a new AC Oil Filter installed at factory-recommended intervals.

125,000 DEALERS TO SERVE YOU

AC SPARK PLUG DIVISION



GENERAL MOTORS CORPORATION







Taken with red (A) filter

How Kodak Wratten Filters give your snapshots true-to-life sparkle

Designed to assure "high-fidelity" results, they are the world's standard for photographers, engineers, and scientists

THE HIGH PIDELITY you read about in musical reproduction is arrived at by electronic filters. In somewhat the same way, photographic filters assure true-to-life realism and sparkle in your snapshots.

They act upon the colors of a scene in such a way that, in a black-and-white snapshot, these colors assume the relative brightnesses seen by the human eye. In this way, white clouds are made to stand out in fleecy grandeur. Green foliage becomes sharply real and well defined. Close-ups of

human subjects are thrillingly lifelike.

This "high fidelity" given to your snapshots by Kodak Wratten Filters is one of the most enjoyable discoveries you can make in photography.

For nearly half a century Kodak Wratten Filters have been the world's standard of accuracy and precision not only in photography but in many other areas of science and engineering. Such universal acceptance is due to the way these filters are made. (See picture story on next page.)

How Kodak Wratten Filters are made



Highest quality dyes. Kodak uses hundreds of different filter dyes, specially selected for purity and brightness, and carefully blended for precise color quality required for each filter.

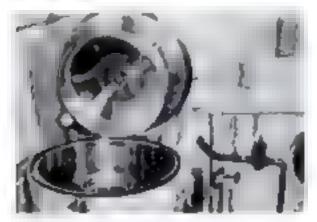




Meticulously filtered. After the dyes are blended according to strict formula, they are filtered and refiltered to obtain the optical quality specified by the Kodak Research Laboratories.



Dyes are color-matched. Each dye solution must match a color standard. A special instrument—a spectrophotometer of unusual design—controls the color of the filters.



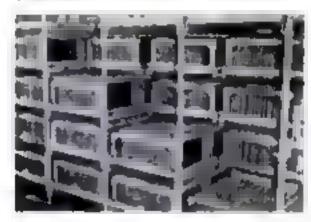
Gelotin is "clorified." In this machine specially selected, color-free gelatin is given high clarity by centrifuging it under vacuum to remove possible foreign particles.



Dyes mixed with golutin. The carefully standardized dye solutions are accurately metered into the liquid gelatin. The resulting crystal-clear mixture is again filtered.



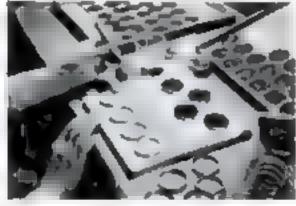
Coating on glass. The dyed gelatin solution is uniformly coated on ground and polished glass sheets and then dried. Here coated sheets are being removed from the dryer.



Conditioned for two weeks. The dried gelatin coating is removed from the glass and conditioned for two weeks in special racks. It is then inspected for color and physical quality.



Glass cut, polished like fine lens. For protection and case in handling, Wratten Filters are mounted between ground and polished glass. Unmounted filters for laboratory use are lacquered.



Comented for permanence.
A continuous layer of cement permanently bonds filter, glass and metal protecting ring into a single unit—like your camera lens.

Prices of Kodak Wratten Filters start as low as 50 cents unmounted, \$1.75 mounted. Consult your dealer for details. Ask for informative filter booklet.



Care and Feeding of Engines

WINDSHIELD WATER LEAKS

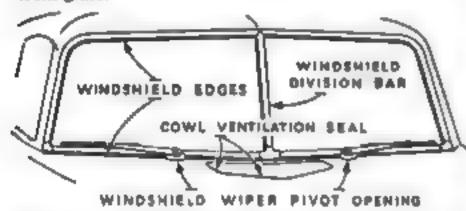
If heavy rain leaks in around your windshield, it means that the edges of the windshield need to be rescaled in the following manner:

WINDSHIELD SEALING

Remove center diviaion bar by taking screws out from inside If leaks occur at center of instrument panel, center bar may not have been tightened



correctly. Loosen, but do not remove, garmsh molding around inside of windshield. Remove windshield wiper arms and stainless steel molding from the outside of the windshield, using care in working it away from glass.



Now seal weatherstrip against the body opening by lifting the rubber and applying a good grade of windshield scaler. Use a notale-type applicator so as to force the sealing compound up and around the body edge where the rubber fits up over the edge. It is not required to seal between glass and rubber unless glass has been replaced. In such a case, remove inside garnish molding and apply sealer between glass and weatherstrip. Seal the windshield all along the bottom and for a short distance up the sides. Wipe off excess sealer and replace moldings, drawing them up so the rubber is slightly compressed. Use a cleaning fluid to remove excess sealing compound.

FREE HELP ON CAR CARE

When it's time to re-ring your engine, be sure to use a Sealed Power KromeX Ring Set, with solid chrome



faces on top compression ring and rails of steel oil ring. These rings are factory scated for fast break-in and immediate oil control, and their chrome faces fight heat, friction, abrasion and corrosion—the enemies of ring life. For your free copy of the illustrated manual, "MORE POWER, Less Gas, Less Oil," simply address a postal card to Dept. H-7, Sealed Power, Muskegon, Michigan.

Sealed Power

Horizontal Hotels [Continued from page 115]

You like being able to park your car at the front door, within view and easy reach. You are comforted by the fact that the fire hazard is reduced in your ground-floor lodgings. You are relieved that you are not expected to tip.

Operators Provide "New Look"

Most motel operators, 94 percent of whom own their own places, have done their best to remedy the conditions that you have sometimes found and always beefed about: lukewarm water, limp water pressure, poor lighting, inadequately soundproofed rooms, narrow beds, cheap furniture, too few mirrors, tiny bathrooms.

On the other hand, they have endeavored to provide what pleases you most in a motel: rooms of various sizes so that you can pick one suited to the size of your party, twin double beds, radiant heating, year-round air conditioning, circulating ice water, an icecube machine, a television set, a telephone, more than one easy chair, and a drying rack in the roomy bath.

You also relish the thoughtful, friendly type of treatment from your host that was recently displayed by a motel manager in Indiana. A party of Chicago hunters homeward bound from a week's hunting in northern Michigan rolled into his driveway late one night, They were more than eager to climb into his comfortable beds, but were nervous about leaving their week's bag of game in and on the car. The motel owner quickly soothed their fears. By the time he had them settled in his cozy rooms, he had their game tucked away in the roomy freezer locker of the drugstore across the street.

Sound Comment

Ed. "The horn on your car must be broken."
Fred "No, it's not broken—it's just indifferent."
Ed. "Indifferent? What do you mean?"
Fred "It just doesn't give a hoot."—Wireco Life

PEE-GEE Pocket Comparator

Sensational new precision optical measuring instrument every mechanic can afford

The "Pee Gee" Pocket Comparator is a precision optical instrument for determining extremely small dimensions. It has almost unbelievable accuracy through the use of a powerful magnifying lens (approximately 6 power) and tiny transparent patterns called "reticles" which are actually extreme reductions of large precise "Master" layouts. The "Scales" reticle, which comes in the instrument, is used to measure dimensions from .0025 to .5000 of an inch in steps of .0025, and 0 to 10 MM in steps of .2 MM.

Other reticles for measuring radii, angles, threads, thicknesses, diameters and fractional dimensions are available for the instrument. Reticles can be furnished with black or white etchings at option of purchaser. The adjustable lens barrel and reticle retainer ring are of machined aluminum with a black anodized protective finish.

This instrument is extremely valuable to printers and artists... and to those whose hobby is building scale models, collecting stamps, making costume jewelry, engraving or etching. It can also be used for a wide variety of small-dimension measuring operations in the home workshop, and is widely used in industry for precise inspection operations.

Six extra reticles for measuring:



RADII... from 14" to 14" in steps of 14" (Reticle \$102).

ANGLES... from 0" to 90" with 5"increments (Reticle \$104).

THREADS... scales for 8, 14
16, 18, 20, 24, 28, 32 and 50 threads per inch (Reticle \$105)

THICKNESS... from 002 to .016 in steps of .001 (Retucle #108).

DIAMETERS . . . circle scales for .005, .010, .020, .030, .040, .050, .100, and '4' to '4' in steps of '4' (Reucle \$109).

DIMENSIONS ... linear measurements from 0 to 1/2" in steps of 1/4" (Reticle #116).

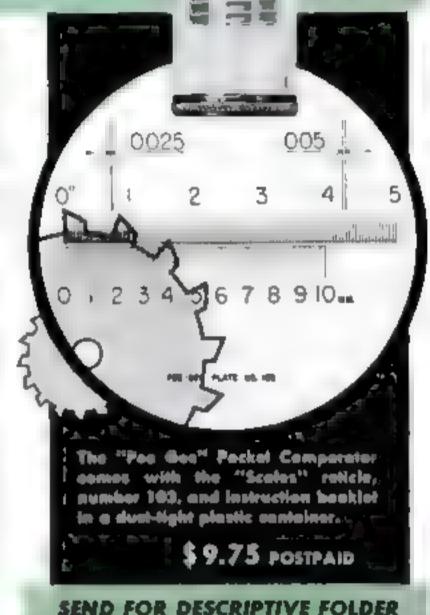
In convenient permanent case, \$4.25 postpold.

adolines trans marriages property are

DISTRIBUTED BY

NATIONAL TOOL CO.

11296 MADISON AVE., CLEVELAND 2, OHIO



	Send me Free Descriptive Folder.
	Send me a "Pee Gee" Pocker Comparator containing the "Scales" reticle. (Please enclose check or money order for \$9.75).
	Send me a "Pee Gee" Pocket Comparator and the convenient case containing the extra reticles. (Please enclose check of money order for \$14.00).
NAME	
NAME	**
NAME ADDRI	20NE



Constant alertness saves lives. It can also help you...

save up to 40% on your auto insurance!

Read how careful drivers get top-notch protection at rock-bottom rates with

STATE FARM MUTUAL

If you're a careful, wide-awake driver (like the man in the picture), you avoid auto accidents.

Why should you pay as much for your auto insurance as careless, reckless drivers who are likely to cause accidents?

At State Farm Mutual, we deliberately aim to insure careful drivers only. Careful, accident-free driving by State Farm members saves money. We pass the saving directly back in the form of low rates. Rates as much as 40 percent lower than the cost of equivalent protection with other good companies.

You get this saving plus convenience and service. Our 3 million members (more than any other company insures) pay for their insurance semi-annually. They are served—in

case of accident — by our own 7000 agents and 700 claim expeditors.

To find the agent who lives nearest you, look under "State Farm Insurance" in the yellow pages of your phone book. Or write: State Farm Mutual, Dept. I-10, Bloomington, Ill.

_			
	77	~	2.45
E '0 15	YOU	Qual	1 2 4 47 7
N. JOHN ET	104	TOTAL CO.	LILVA
	100	AL MINI	

State Form aims to insure careful drivers only.

Drivers who can be counted on to

- Be alert for emergencies
- Make full stop at stop signs
- Heed crossing signs/s
- Obey speed laws
- Be extra careful on slick pavements
- Avoid passing on hills or curves
- Avoid mixing alcohol and gasoline
- Yield pedestrians the right of way

STATE FARM MUTUAL



"the careful driver insurance company"

State Farm Insurance is written only by the State Farm Mutual Automobile Insurance Co. and its wholly owned affiliates:

State Farm Life Insurance Company State Farm Fire and Casualty Company

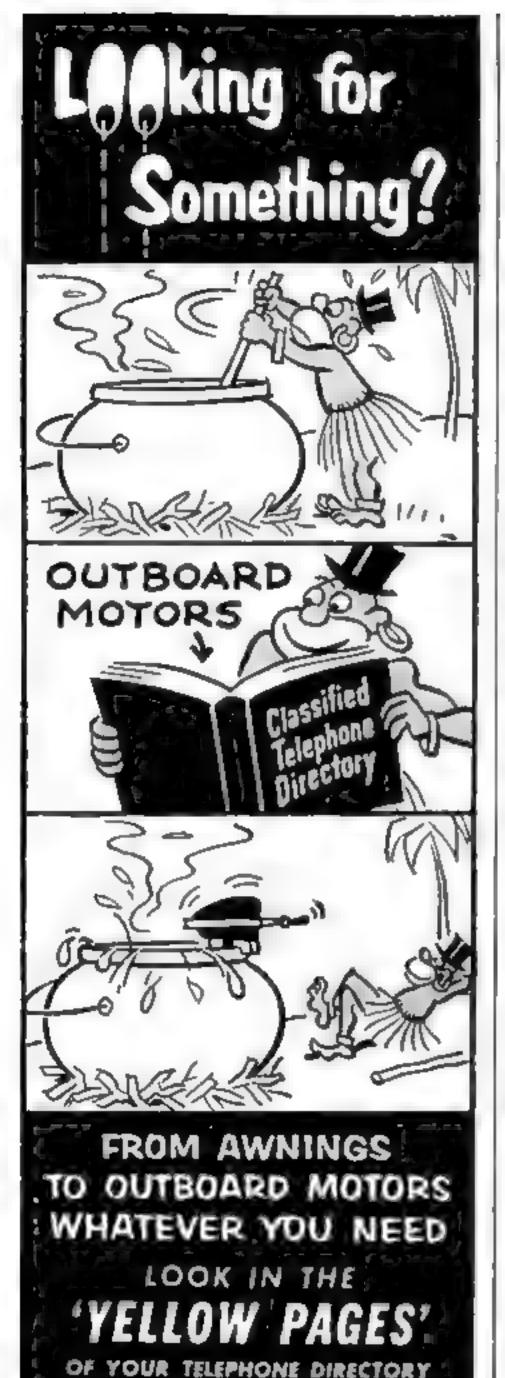
FREE TO MEMBERS!

Ask your agent for your new State Farm insignia (like above) in bright red headlight-reflecting Scotchlite. Display it proudly on left rear car bumper to identify yourself as "careful driver, soundly insured"... to provide emergency reflection when parked or if taillight fails.

Home Office: Bloomington, Illinois. Field claim offices in 325 principal cities. 7,000 agents in 40 states, District of Columbia, and Ontario, Canada

Hear "Jack Brickhouse Sports News" Saturdays and
"Cecil Brown News Commentaries" Sundays over Mutual Stations.

Check local radio listings.



ABC's of Color Television [Continued from page 83]

magazine covers. There, pigments subtract various parts from white light to create the desired shade.

Back porch: Part of the color TV wave that carries the color sync signal, which synchronizes receivers with the transmitter.

Chroma control: The knob that lets you adjust the vividness, or saturation, of the color picture. It doesn't alter the actual brightness of the image, or change colors, but will vary the intensity from pale pastels to deep shades.

Decoder: The primary-colored lights on the viewing screen that create the color image are controlled by primary-colored signals (red, green and blue). These, however, are not transmitted as such in the color TV wave. Instead they are scrambled into a code. It is the job of the decoder circuits in the receiver to unscramble the wave into the red, green and blue signals that the picture tube needs.

Electron gun: The phosphors on a viewing screen glow when struck by electrons, which come from a gun located at the other end of the picture tube.

Frequency interlace: The color TV wave carries about twice the load—information—that the black-and-white wave has. Yet it must fit into the same radio space—band width. This is accomplished by frequency interlace: the color signals are interleaved into spaces left empty in a black-and-white wave.

Green video voltage: The signal coming from the green camera tube or going to the green gun in the viewing tube. It corresponds to the green part of the picture.

Hue control: A receiver knob that helps keep red red, green green, and so on. It sets only the basic color and does not affect shading or brightness.

I signal: One of the three signals in the color-television wave as it is actually transmitted through the air. It is a code

[Continued on page 214]

Make the picture perfect with a "Travelized" Ford!





Wherever you go for service insist on Genuine Ford Parts



Get Good Performance the Way Big Fleets Do

Yellow Cab, Oakland, California, standardises on Federal-Mogul oil-control engine bearings.

Yellow Cab Company rolls up more than half a million miles every month, delivering the good people of Oakland, California to their destinations.

Dependable performance is a Yellow Cab must. That's why they always replace with Federal-Mogui oil-control bearings on every engine overhaul.

Federal-Mogul oil-control bearings have led the replacement field for 30 years—because of quality. They will restore fine performance to your car, too. Ask your mechanic! FEDERAL-MOGUL SERVICE, Division Federal-Mogul Corporation, Detroit 13, Michigan.

for New Power . . .

FEDERAL-MOGUL

Oil-Control Bearings

BEARING
MANUFACTURERS
TO THE
AUTOMOTIVE
INDUSTRY
SINCE 1899



ABC's of Color Television

[Continued from page 212]

made by mixing certain proportions of the red, green and blue signals from the camera. It contains information needed to reproduce colors ranging from bluish green to orange.

Jack: Socket on electronic equipment for plugging in test instruments or accessories.

Killer: Color sets can also receive black-and-white shows, but to do so properly their color circuits must be switched off. The killer tube does this automatically, being triggered when the incoming wave lacks a color sync signal.

Luminance: Technical term for brightness—how light or dark (not how pale or deep in color) the picture is.

Matrix: A circuit in the camera that mixes the red, green and blue signals from the camera tubes to create the I, Q and Y code signals to be sent through the air. A similar matrix in the receiver unscrambles the I, Q and Y signals back into the red, green and blue signals for the viewing tube.

NTSC: National Television System Committee, the electronics-industry group that worked out and gave its name to the present color-television standards.

Oscillator, subcarrier: A precisely controlled circuit in the receiver that governs the handling of the color signals.

Purity coils: Electromagnets on the color-picture tube that keep the three electron beams aimed correctly. Even a slight misalignment would cause the beams to hit the wrong color phosphor dots on the viewing screen, since these are very tiny and very close together. The result might be a green sky and red grass.

Q signal: One of the three signals in the color television wave as sent through the air. It is a mixture of the red, green and blue signals from the camera and contains information needed to reproduce yellowish green to purple.

Red video voltage: The signal coming from the red camera tube or going to

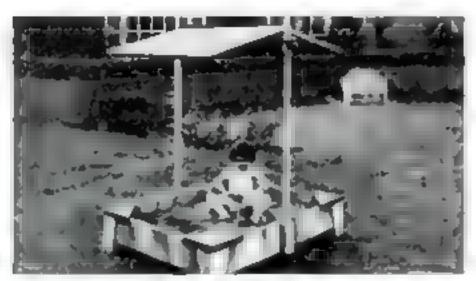
[Continued on page 216]

MAKE YOUR OWN PORCH and PLAY-YARD EQUIPMENT

for Outdoor Living this Summer!

It's Easy and Simple to do with Amazing

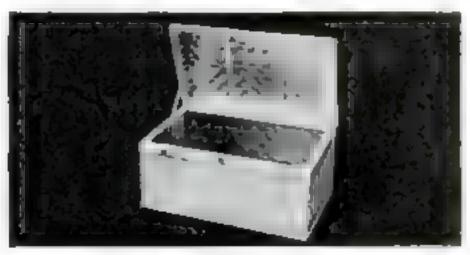
REYNOLDS DO-IT-YOURSELF*ALUMINUM



SAND BOX with Reflective Sun Shade provides happy hours for youngsters protects them from hot sun. Shade adjusts to any height lowers to serve as cover Rust-proof, so easy to clean. Plan #112, 25c with coupun.



FOLDING TASLE. Ideal for cards, informal eating serving, base for portable grills indoors or outdoors. It's all aluminum stays bright and new-looking, won't ever rust. Reynolds Plan #110, 25c with coupon.



HANDSOME FIGNIC HAMPER is a picule to make with Reynolds Do-It-Yourself Aluminum. Sturdy, light-weight, plenty of room for food and picule equipment. Reynolds Plan #111, 25c with coupon.

It's no trick at all to make things with amazing Reynolds Do-It-Yourself Aluminum. All you do is follow any of our simple plans (see coupon below) ... and make things that would do credit to a professional craftsman.

terial is specially engineered for use with standard woodworking hand or power tools. You can saw it, drill it, plane it, joint it, just like you do wood. And think of the other advantages: Reynolds Do-It-Yourself Aluminum is bright and beautiful, it's strong and sturdy, and it will never rust ... perfect for outdoor use as well as indoors. Mail the coupon for the simple Reynolds Plans today.

CAUTION: Use only Baynolds Do-It Yourself Aluminum . . erdingry pluminum may harm tools. Look for special Scal [shown on coupon] attached to each piece.



smart Postable Strving Cast. . . . a marvelous convenience indoors and outdoors. Light functional and rustproof it s a simple job with this fabulous Aluminum. Reynolds Plan #114, 25c with coupon.

*7 M. Reynolds Metals Company

SEND FOR THESE EASY PLANE TODAY!



REYNOLDS SALES COMPANY 2493 South Third Street, Louisville, Kentucky

Please send me Reynolds Do-It-Yourself Aluminum Flore as checked below 1 enclose 25c in cash or money order for each Plan ordered.

| Reynolds Plan #112 for SAND BOX ...
| Reynolds Plan #110 for FOLDING TABLE | Reynolds Plan #111 for PICNIC HAMPER | Reynolds Plan #114 for SERVING CART | How-to Booklet containing general instructions and suggested projects

lare

Address ..

Enymolds Do-11: Yourself Aleminum is available in Canada

25e



Now-an easy way to wash your car!

JUST SPONGE IT ON -RINSE IT OFF!

FAST-ACTING, ECONOMICAL DU PONT CAR WASH

NEW DU PONT CAR WASH cleans faster and easier than you ever thought possible. Just sponge it on . . . rinse it off . . . and your car dries itself. No wiping or chamois work! Du Pont Car Wash gets off all the grease and grime . . . leaves your car spotless.



One tablespoonful washes your car. Half-pound can gives 20 washes!

DU PONT Nº 7: PRODUCTSFrom Chemical Research . . . For Easier Cor Care



SETTER THINGS FOR SETTER LIVING . . . THEOUGH CHEMISTRY

ABC's of Color Television
[Continued from page 214]

the red gun of the receiver picture tube. It corresponds to the red part of the image.

Saturation: Technical term for vividness of a color—scarlet is more saturated than pink, for example, although both are the same hue (red) and could be the same brightness. The chroma control on the color receiver adjusts saturation.

Three-gun tube: Most of the color picture tubes now being made have three electron guns, one for each primary color. Single-gun tubes are also being developed.

UHF: A band of TV frequencies, recently authorized, with 70 channels and ranging from 470 to 890 megacycles.

FHF: A band of television frequencies, in use since 1946, containing channels 2 through 13 and ranging from 54 to 216 megacycles.

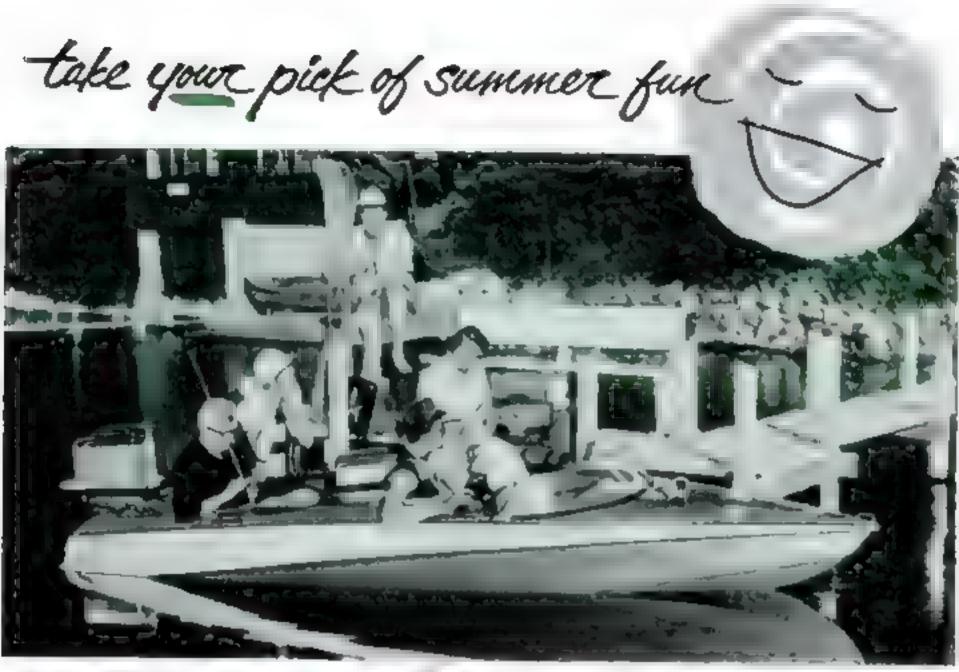
White level: Part of the television wave that limits the "whitest" white the picture can reproduce. The black level sets a similar limit to the "blackest" black.

Y signal: One of the three signals in the color-television wave as sent through the air. It is a mixture of the red, green and blue camera signals, but so proportioned that it contains brightness information rather than color information. It is almost identical to the standard black-and-white TV signal. When ordinary black-and-white receivers are tuned to a color telecast, they use the Y signal (disregarding the I and Q signals) to reproduce an excellent black-and-white image of the color picture. This is what makes the system compatible.

Zero reference: A point from which measurements are made. The color sync signal, for example, is zero reference for setting the I and Q signals.

Horse Sense

On a questionnaire asking; "What is the principal contribution of the automobile age?" a student replied: "It has practically stopped horse stealing."—Pure Oil News.





Today's Most Powerful Outboard?

40 h.p.

MARK 50

FORWARD, NEUTBAL, REVERSE

- 4 Cylinders in Line Famous Thunderbott engine for super-smooth power flow...overlapping torque
- "Hi-Thrust" Lower Unit
 Remote Fuel Tank
- Optional: Exclusive 12volt electrical system starter and generator to power lights, accessories



- Famous Hurricane powerhead
 Reverse Gear and Neutral
 Compact design—big
- engine performance
- · Remote Fuel Tank

What's your pleasure? Fishing ... water skiing ... an outboard cruise on your favorite waterway ... a day's outing for the whole family? You'll find more enjoyment in all of these with a Mercury! Your Mercury dealer is listed in the yellow pages of your phone book.



Reliable Rocket engine
 Duo-Flex Propeller Clutch—no shear pin
 Waterproof Magneto and Spark Plugs



• Weight only 40
poweds! • Push-Button
Clutch • Dual-Purpose
Drive—truly weedless

Write for FREE lifestrated entalog.
Factures of Morcury motors are protected
by issued or pending patents.

O 1954 Kirkhoufer Corporation, fond du Lec, Wis.

Program Chairment Ask your dealer about Mercury's exciting sound, color, water sports films. No obligation.



I.IQU'I-MOLY coats all engine friction-surfaces with a protective anti-friction metal plating of shippery Molybdenum Disulfide. Your engine gains new smooth gliding power—not possible with oil stone. Proved in millions of cars, trucks, buses and tractors.

At gas stations, auto supply stores, etc.

MAIL ORDERS ACCEPTED

If your dealer does not yet have LIQUI-MOLY.

COMPLETELY QUARANTEED MOLY MOTOR PRODUCTS CORP. Dept. M-2, 1155 Breedway, New York 1, N.Y.
Please send me:
cans \$1.50 size LIQUI-MOLY
Name
Address
CityZoneState

The Great Windshield Mystery [Continued from page 59]

of the independents, I saw C. H. Cronin, a harried man with two jangling telephones.

"We're coming out with an official statement," he told me. "We can't find a thing in this pitting business. Our research director, Dr. Frank Cox, has had his lab really working over sample windshields flown in from Seattle and elsewhere. Microscopes, X-ray diffraction, scintillation counters—the full treatment.

"All marks on windshields flown in here have been caused by marks from gravel, cinders and the like. We can produce microscopically identical marks in the lab, just by hurling the same materials at new glass. No radioactivity; no chemical attack; no electrical attack; no temperature sensitivity."

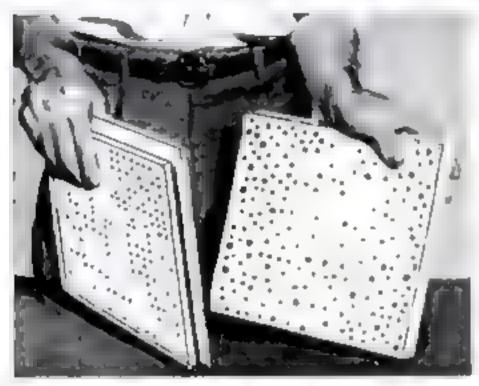
Cronin paused to cope with his telephones. "The windshields shipped in," he went on after a moment, "show what glass men call 'crush marks'—local impact damage. We ran some X-ray diffraction analysis on stuff that was supposed to have been collected from pitted glass in the Midwest. Turned out to be asphalts and dolomite, which are common road materials. Those radioactivity rumors are cockeyed—long exposure to intense radiation doesn't pit glass."

He described how in one community that had been studied the pox had appeared suddenly, swelled in one weekend to an epidemic, and then died. Apparently it started when a local broadcaster, after airing the story of the Bellingham pittings, had gone out and studied his own windshield. He found a crush mark and called the state police. A trooper and he found other marks on other cars. They dug up a local college professor with a Geiger counter, who pronounced the pittings "positively not radioactive." Then, somehow, the situation blew up; in hours the wires out of town were carrying excited tales of how the windshields of "nine out of every 10 cars in town" had suddenly become mysterrously pitted.

[Continued on page 220]

Install this noise-muffling ceiling yourself

Why let noise take the fun out of your basement playroom? You can provide comfortable quiet —and have a handsome ceiling firush, too—simply by installing a noise-obsorbing ceiling of either Armstrong's Cushiontone or Perforated Temlok Tile. It's easy, economical—do it yourself.



Both Cushiontone and Temlok Tile are perforated wood fiber materials. Cushiantone's noise-trapping hates are arranged in Armstrong's exclusive new "Full Random" pattern, while Temlok's perforations are in neat, strought rows. Both materials are factary finished, can be washed or repainted if desired.



Start by nailing up seasoned wood furring strips as a base for installation. 1" x 3" strips should be nailed at right angles to the joists on 12" centers. Shim the furring where needed to provide a smooth, level surface. Cushiantone can also be cemented direct to plaster or other smooth surfaces.



The special Lak-Bevel joint with its extra wide flange speeds noiling or stapling of Perforated Temlok Tile. The shallow-drilled nailholes in each corner of Cushlantone also help to make installation quick and easy. When nailing up Cushiontone, use nails with Ratheads or collars 1/4" to 3/4" in diameter.



In a few hours, your noise-absorbing ceiling will be finished—a beautiful and practical ceiling for your playroom. Your whole family will be so pleased with the new-found quiet, you'll also want to sound condition your kitchen, workshop, or den with Cushlantage or Perforated Temlak Tile.

Your building materials dealer will be glad to give you full details on full Random Cushiantone, Temlok Tile, and Armstrong's other building materials. For a free booklet on Cushiantone and Temlok acoustical ceilings, write Armstrong Cark Company, 4207 Washington Avenue, Lancaster, Pennsylvania.



RONG'S CUSHIONTONE

M-67® Monowall®

Insulating Wool • Hordboards



You can ask your "Mrs." or any housewife! Liquids will get spilled on the sinktop and the kitchen table. She'll tell you it's work cleaning-up.

You can delight her by installing St. Regis Panelyte. And it's so easy to do. Then she can clean this surface by simply wiping with a damp cloth. Lovely St. Regis Panelyte is a bard plastic with its design and bright color built in. Hard to scratch or sear!

With sample hand tools you can save yourself a lot of money, too, For a Panelyte installation is an important improvement. Adds value to your house. Just order the standard size sheets up to 4' x 10' in Panelyte's Easy-to-Apply one-tenth-inch thickness.

See your building materials dealer or floor coverings store today.

ST REGIS PANELYTE	Send for FREE "Do-lt-Yourself" Booklet
	PS-754
St. Regis Poper Company,	Penelyte Division
Box 40, Grand Central P.O.	., New York 17, N. Y.
Send FREE Instruction book	let lo:
Home	
Street	
Cly	Zeate Shada

The Great Windshield Mystery

[Continued from page 218]

The mystery evaporated under careful scrutiny. Pittsburgh Plate sent a man who studied more than 150 windshields in town. He found only conventional crush marks, in amounts that would be expected in a community with gravel roads nearby. Older cars and those with high mileage had the most marks, including those that had been parked in protected garages during the period of "mystery." Twenty-five brand-new cars stored outdoors during the epidemic showed no marks at all. High-mileage cars with marks also had evidence of stone damage on the headlights and metal surfaces.

A phone jangled and Cronin began patiently to explain "disintegrating" glass to an inquirer. I tiptoed out.

The library story. Back in New York I discovered a fascinating volume in PSM's library. Called "On the Objective Study of Crowd Behavior," by L. S. Penrose, M.A., M.D., it is a scholarly British tome on the infectious properties of ideas.

it offered the best explanation yet of the great windshield mystery: People saw pits because they had been led to look for pits, Says Dr. Penrose:

The course of any craze is marked by certain phases . . . which follow closely the pattern shown in an epidemical physical disease. First there is a latent period . . . Next comes the phase during which time the idea spreads rapidly. The number of people who accept the new idea mounts with an increasing velocity which may develop an almost explosive character. As the market of susceptible minds becomes saturated, the velocity of the wave . . . begins to slacken. This is the third phase. The fourth phase is marked by the development of mental resistance against the idea, which resembles immunity to infection in the sphere of physical disease. During this period the mental infection wanes; in those already infected the enthusiasm becomes weaker. and there are few new cases . . . END

Next month Frank Rowsome Ir. tells you the truth about your car brakes.



and



about Kaiser's supercharged "power-on-demand"

Q: What is "power-on-demand"?

A: "Power-on-demand" is the new kind of power produced by Kaiser's newly designed Super-power Engine, with supercharger. It combines breathtaking acceleration and performance with small-car economy.

Q: Where else are superchargers being used today?

A: Almost every airliner you ride in uses superchargers to gain speed and altitude. They are also used in some racing cars and expensive custom jobs.

Q: How is Kaiser's supercharger different?

A: Kaiser's is a variable-drive supercharger, controlled by a solenoid switch on the accelerator. It operates whenever the engine is running, with slight output at normal speeds and maximum acceleration instantly when you step down on the gas. It's virtually silent in operation.

Q: How does it work?

A: It forces the fuel-air mixture into the combustion chamber under high pressure, for faster, more effective combustion, thus preventing starvation in any cyclinder, even when driving at highest altitudes.

Q: Is it available on any other car?

A: No. It was developed by Kaiser and

McCulloch engineers as an integral part of the new engine for the '54 Kaiser Manhattan—the only production car factory equipped with a "blower."

Q: How many horsepower does Kaiser's supercharged engine develop?

A: Up to 140 h.p. at 3900 r.p.m., and up to 215 pounds of torque at 2400 r.p.m.

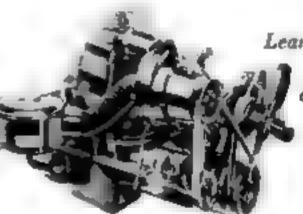
Q: Is it expensive to operate?

A: No. The small engine displacement saves money in normal driving—you pay for extra power only when you use it.

Q: How does it work with Hydra-Matic?

A: "Power-on-demand" plus Dual-Range Hydra-Matic" is the next step ahead in effortless driving. (Overdrive" also available.) Your Kaiser dealer will gladly arrange a test drive.

*Optional at low extre cost.



Learn more about
"power-on-demand"
at your Kauser dealer's



Drive with "power-on-demand" in the new

'54 Kaiser

G1954 TAISER-WILLYS BALES DIVISION, WILLYS MCTORS INC., TOLEDO, DHIO

WHEN IT COMES TO WOOD FILLERS THERE'S NO SUBSTITUTE FOR PLASTIC WOOD!



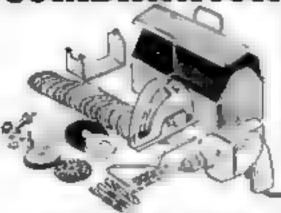
Plastic Wood is stronger—resists weather Sands down to a smooth, hard finish. Professional craftsmen have preferred Plastic Wood for more than 50 years because it takes paint, varnish and other finishes best. Will not chip, crack or peel . . . won't pull away! In cans and tubes.

In Natural and 8 wood colors!

"PLASTIC WOOD"

The New Improved Model 38-98

COMBINATION



(MCLUBES: Comming V₄"
Pintul-Grip Electric Brill;
Commins Saw Attachment;
Combination Saw Students;
Combination Saw Students;
Sout of Brills; Lamba Wood
Boanel; 12 Sanding Biser;
Stud Arbor and Attachments; Cloth Builling
Whool; Brinding Wheel;
Wire Wheel Level; Stud
Point Mixer; Stud Boack
Stund; Pactable Stud
Corrying Case.

Price of Dynamic Power Tool Combination complete is \$37.95

No Money With Order - No C.O.D.

Try is ten days before you boy, if completely unterfind then send \$4.95 and pay belonce or rate of \$5.00 per month for 5 months — He interest or Carrying Charges Added, if not completely satisfied, reform to us, no explanation necessary.

KAPNER HARDWARE, INC.

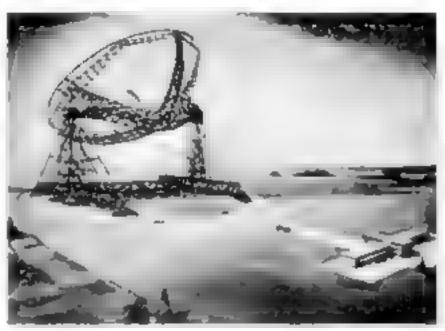
Dept. A-106, 2248 Second Ave., New York 29, N. Y. Places such 1 Dynamic Power Tool Combination. I ogres to pay \$4.95 within 18 days after receipt and \$5.00 per month therefor.

_		
Hamet		
Address		
644	T-ma	State

Looking into Space with Radio Eyes [Continued from page 80]

instruments' inferiority to optical telescopes in resolving power, the ability to define details clearly, which depends upon a telescope's diameter measured in wave lengths. It would take a radio telescope as large as the Pacific Ocean to match the resolving power of the 200-inch Palomar telescope!

What is next-best? One answer is to



LARGEST OF BOWL-TYPE radio telescopes, this 250-foot-diameter giant is being built at Manchester, England. Two high towers will rotate with it on a circular radway track.

build a single radio telescope as large as physically possible. Due for completion at Manchester, England, in 1955 is a bowl-type radio telescope of record 250-foot diameter, steerable toward any part of the sky. Under direction of Prof. A. C. B. Lovell, work on the milliondollar instrument is well advanced.

Another answer is the interferometer-type radio telescope, with two or more aerials, up to one-third of a mile apart, joined by cables to one receiver. The effect is as if the aerials were small portions of one gigantic one. The new Cambridge radio telescope is of this type—a "double interferometer"—unprecedented in resolving power, as well as in size. To sweep the heavens, it depends upon the earth's rotation. Meanwhile a wavy line upon a chart records incoming radio waves' strength. Its units tilt to cover the sky in strips.

Observations with these two new instruments should bring about the next great advance in radio astronomy. END

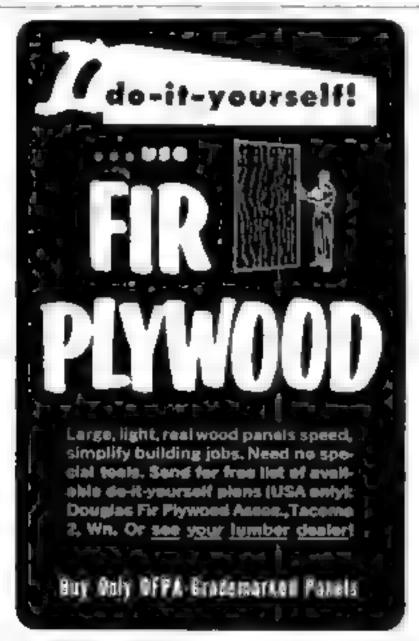




The revolutionary new DREMEL Jig Saw cuts 115° wood. Re prywood fast as you can follow a line - a so cut a nexa, pustic, atc. New HOCKER AC-110N principle man tasts constant boads tension—ones taster long hors blade like Prwered by a rea; ROLARY motor its sugged enough for production with outer its sugged enough for proother jig saws 4-Way Blade Holder saws in any direction takes any length stock. Has triting table foolproof blade guard makes it sais for some and children. Do lar-for-dollar the new DREMEL out-performs them a 1

BEE YOUR DEALER If he can set empty profes direct on 5 day trial manney has a quantumer. Ret it in 6 to for pass and abipment, or ages at pay to senten be used to se present and 4 OD.

DREMEL MFG. CO. Dept. 124-G, Racine, Wis.



Beware the Ugly Sting Ray! [Continued from page 118]

Dr. Russell's project started out, rightly enough, as a standard laboratory problem. There was one hitch, however; sting-ray venom was not exactly a commonplace commodity. So, before he could even begin to work, Russell had to shut up his laboratory and go fishing.

He's been fishing ever since, and though other fishermen think he's crazy, he calls a fishing trip a complete success only when he can bring back a nice mess of sting rays. Though his interest in the sting ray is strictly scientific today, it can probably be traced back to the day when he got stung by one. Between that day and this he has learned a good deal about this unattractive fish

Sting Ray Comes from Big Family

There are enough varieties of sting rays in the seas of the world to confuse the most orderly ichthyologist. They range all the way from the giant stingaree of Australia, weighing up to 700 pounds, down to the small round sting ray, rarely more than 20 inches long, which is common to the waters off southern California. Cousins of this small ray are found off the south Atlantic states and in the Gulf of Mexico,

The sting ray has few natural enemies, which is one reason the tribe continues to increase. Several species of shark prey on it, but pay heavily for this foolishness. These sharks are often found with as many as a dozen of the barbed stings in their stomachs.

There is no real way of telling how many people get stung every year, but a check of lifeguard stations along a 100-mile stretch of the southern California coast, from Santa Monica to San Diego, showed that over a seven-month period, from April to November, 1952, there were no less than 390 sting-ray "attacks."

When Russell goes after big rays he heads for the Mexican town of San Felipe, on the Gulf of Cahfornia, some 120 miles below the U.S. border. In the heat of summer the rays sometimes swarm

[Continued on page 226]



BUILD YOUR OWN MODEL OF THE

M.G. SPORTS CAR!

Here's the ultimate in craftsmanship -- a realistic replica of the famous British M.G. -- finest model kit ever produced!

This Model masterpiece has more than 50 precision-fitted parts, including steerable front wheel assembly, semipneumatic tires and semi-elliptical rear springs — yet it requires only a screw-driver for assembly. Body is durable diecast construction, chassis is heavy steel. Comes with gray primer coat - can be painted to your preference.

An absorbing, educational "father-and-son" project, the Model MT is a rugged, thrill-packed toy when assembled—or a handsome collectors' item for sports car owners and hobbytata.

Price West, \$11.75 Made by the makers of

world famous POOEPKE

TREE FOR FREE CATALOG, WRITE TO: ELE The CHAS. WM. DOEPKE MFG. CO., INC., ROSSMOYNE I, OHIO

Drive out Basement dampness

with the amazing FRIGIDAIRE electric DEHUMIDIFIER



18¼" high - 20½" long - 11¾" wide-

Positively controls moisture in linea closets, basements, playrooms, bank vaults, workshops - or any closed area up to 10,000 cu. ft. where moisture is a problem.

Fan draws air through refrigerated coil. Moisture is condensed and collected in container. May be connected to drain. Plug into any outlet.

See your Frigidoire Deoler for further details. Or write for free folder to Frigidaire, Dept. 2274, Dayton 1, Ohio. In Canada, Toronto 13, Ontario.



Built and backed by General Motors

Do-it-Yourself with the new Weldwood PRESTO-SET*GLUE

Perfected at last! A ready-to-use glue worthy of the Weldwood name. Works like a wizard on just about everything made of wood, cloth, leather, fibre, paper, etc.

Use Presto-Set to make drapery cornices; to repair luggage, sports goods, furniture, toys, record albums, to mount maps, snapshots, collections, awards, etc.

For fast-setting glue Jobs in home, bobby, shop. PRESTO-SET does it all, and better.

At lumber, paint or hardware stores, in 25¢ and 45¢ tubes, pint and quart bottles. If not yet stocked send 25¢ for a full size tube. Larger sizes for industrial users.



FREE! Lauflet of many uses. Write Dept. PPS 76 Box 205, New York 46 UNITED STATES PLYWOOD CORPORATION



me Deluxe 75' I	ree booklet, "On the Level." [LEVELALL @ \$12.95 []Regul []Ship postpaid full price enc	ar 50"
⊟šhip C.O.D.	Coult heatherd and base ser	nuncu.
3.5		
Name		
Name		_

Beware the Ugly Sting Ray! [Continued from page 224]

into this protected harbor in such numbers that they pancake out of the water as they jostle for favored locations.

Russell and his colleagues use various systems for collecting rays. Sometimes they set gang lines, with 50 or 60 baited hooks-and can usually count on hooking an average of 10 rays, and as many sharks. Beach seining, in which a net is taken out by rowboat, set in 15 or 20 feet of water, pulled across the bottom, and hauled onto the beach by a team of four men, usually yields plenty of rays in season. And a day on one of the shrimp boats that put out from San Felipe yields even more. When the nets are pulled in, every two hours, they are often filled with as many sting rays as shrimp.

Some Fishermen Use Spears

The most sporting method of all is to track the rays down and spear them. The scientists, in a 16-foot boat with an outboard, crisscross the bay at San Felipe until they spot a good-sized ray sunning itself on a sand bar, Russell, in the bow of the boat, takes aim with his spear gun and fires down into the water. As the spear, with its tow rope arcing behind it, finds its mark, the big ray thrashes wildly, then takes off for deeper water.

There is nothing for the men to do but hang on and wait for the ray to wear itself out, as the boat drags along in the big ray's wake. Depending on the size of the ray (and Russell has caught them here all the way up to seven feet across) it will be a half hour or more before the ray is tired enough to be safely hauled in.

Working cautiously and quickly, Russell chops off the ray's tail at the base. and the big fish is pushed back into the water. Though it has lost its defensive weapon, it is quite capable of going on

about its business.

The tail is promptly stored in a dry ice chest. Then, as soon as they get back to shore, the scientist-fishermen get to work. In a house trailer converted to a small laboratory, they scrape the tissues from

[Continued on page 228]

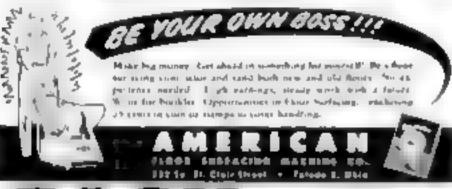


MOTORISTS—Had your Oil Filter checked recently?

If not, chances are it's choked up—can't keep up its engine-saving, money-saving work. Better put in a new Purolator Refill. (Conta se little se \$1.60.)



World's Fined OIL FILTER



YOUR SPARE TIME

TO \$40 A BAY IN YOUR OWN BUSINESS Emp to start report each learness of home with the New OE. SAME ... phorpusing and nothing circular saws, granding planer and poster knows: Low Cost, poly \$3.5 doors

Start to work the day year BELSAW arriver, the mrience peeded. Herefreds of jubs to your neighbor-Sand Today for Free Book ilations Society .

BELSAW MACHINERY CO 4407 B Freid Bidg .. Kansas City 11, Mo



ALSO Enhelman SPORT

LOWEST PRICE

70 Miles Per-Gal. Ifo.Sp 1 Adult From Literature

Lowest Price East food p Kasy Haut, East Lagner Wrete for Catalog Top quality worded steel construc-Spend wheels tree, runge hich at Write ESHELMAN CO., Dept. ST 67
ETPLISH M. Balto. 2. Md. 133M. Michigan ave. Co cage Lt I 7070 Herlywood Olyd Los Angeles 28 Co

DATE COATED threefore Sharper Clearer Crispert Prices Include leather case and straps

10 POWER \$1945 Pain size jet fold 18

Power Perfectly but
paced Reg. \$34.05.

Power \$1495 • Team \$1695

as. 1 purpose. Reg. \$34.50

A I purpose. Reg. \$34.50

Very popular

Neg 149.50

I pried 129.5

Day a Nile C, ass. Reg. \$49.50

Conrebt d power. Reg. \$30.50

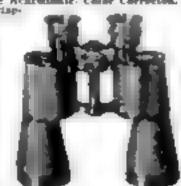
Content for full refail Made in Japus, Add only 10% Fed tax Cash orders

Poid C O T Include 22 M deposit

United Binocular Co., Dopt. Aff-116

So43 So., Western, Chicago 20, 411

DEALERS WANTED! WRITE FOR MIDLESALE CATALOG



oke wa

STATISCES Actrometies are COATED!

Don't get stuck with a rust-clogged radiator!



At the first sign of overheading

use new, improved

If a rusty radiator causes your engine thermometer to read high on moderate summer days, don't wait for a scorcher. Put in Du Pont Cooling System Cleanser right away. It cuts grease with detergent action, cleans out scale, and dissolves rust so that water drains out clear. And neutralizer in each can completes the job. Du Pont Cooling System Cleanser is thorough, safe, simple.





Keep your radiator clean with new

DU PONT ANTI-RUST

Once your cooling system is clean, keep it that way with Du Pont Anti-Rust. This new liquid inhibitor retards rusting, inhibits acid formation and lubricates the water pump as well

IU PONT Nº 7, PRODUCTS From Chemical Research . . . For Easier Car Care



DETTER THINGS FOR BETTER LIVING ... THEOUGH CHEMISTRY



6" PRECISION LATHE

In the low-cost precision lathe field Atlas is first choice for the home shop... for development or commercial work! Outstanding features include: Timken tapered roller bearings—quick-change countershaft—V-Belt drive—reversible automatic langitudinal power feed—precision ground bed ways—8 to 96 threading range—18 speeds, 54 to 3225 R.P.M. You can DO so much MORE so much BETTER with an Atlas! See it at your nearest Dealer's, or—

WRITE FOR FREE CATALOG TODAY

Alas. Press. Company

ATLAS WOODWORKING POWER TOOLS
ATLAS METALWORKING MACHINE TOOLS

ATLAS WOODWORKING POWER TOOLS ATLAS METALWORKING MACHINE TOOLS CLAUSING HEAVY DUTY MACHINE TOOLS 725 N. PITCHER ST., KALAMAZOO, MICHIGAN

п		177
	Have more	
Ť	gorage	-
Þ	· · · · · · · · · · · · · · · · · · ·	
	storage	4
a	shace with	
0	MASONITE .	
ø	Peg-Board PANELS	٠
-	Your garage can be rieat and tidy.	*
e-	Use those easy-to-put-up 4-ft.x 8-ft	-0
	panels with handy hangers.	

· *Kag	F. T.M. U.S. Pet. Off. B. B. Butler Mig. Co., In
	SATURALLY STRONGER WITH LIGHTIN
PRESDWOOD	MASONITE:
MODE WHOS BELLEY	CORPORATION
	Dept. PS-7, Best 777, Chicago 90, III.
Please send Idea Ba I enclose I Oc to cove	ock and Plan AE-274 for Garage Interior, or partage and handling,
Numerocco	
Address	****************
Town	
County	

"Masonile" signifies that Mesonile Corporation is the source of the product

Beware the Ugly Sting Ray! [Continued from page 226]

the barbed stings they have collected, grind the material up, spin it down on a centrifuge, and draw off the extract. The distilled sting-ray venom is then ready to be used in experiments.

While it is fortunately rare, men have undoubtedly died from the effects of this poison. Working with the venom at the California Institute of Technology and at the Huntington Institute for Medical Research in Pasadena, California, Dr. Russell recently discovered that the venom from a 1%-inch sting, injected intravenously, is enough to kill a rabbit within a few minutes. Small wonder that human

Sting Rays Lurk on the Bottom

victims of the sting ray feel pain.

Sting rays like warm, quiet water. If they are not actually buried in the sand or mud on the bottom, they will be swimming near the bottom. Whenever you are wading in areas where you suspect that there are sting rays, it is wise to shuffle your feet, rather than step along naturally. Russell and his co-workers have found that when they do this the rays usually swim away.

If you are stung by a ray, wash the wound out at once with the cold salt water at hand. A constriction band can be put above the stab site. Then, when the wound has been thoroughly irrigated, and seems completely clean, soak your foot or leg in hot water—as hot as you can stand it—for as long as an hour. Then the wound should be covered with a sterile antiseptic dressing. If your injury seems severe, better see a doctor.

Of course you won't ever need any of this advice if you'll just remember that the sting ray is anything but a belligerent fish; it probably never uses its sting except in self-defense. So join those other smart fishermen and bathers—and give the sting ray a wide berth.

No Short Cut

You can't be safe by accident.-Viking Vacu-

SURPLUS TEMPERED STEEL CIRCULAR SAW BLADES

DUPONT WYLON CORDS 46 DRILLS



\$1.39 ppd. 10" blode \$1.59 ppd.

Not just ordinary, imported blades, but first-quality, heavygauge, tempered tool steel blades designed especially for long and rugged use, and made right here in America. Available with %" and %" bores (10" has %" and %" bores) to fit all popular makes of hand, power and table saws.

Will fit Skil, Delta, Shopsmith, De Walt, Stanley, Black & Decker, Mall, Craftsman, and most other equipment.

When ordering specify equipment name, blade and bore.

6" DADOES "" and %" bore with 3 blades and

Bolow Manufacturer's Costi Outwears Ordinary Rope 10 to 1 Light, Strong, Durable, Quick-drying. Will not rot or mildew, Ideal for Indoor or Outdoor use. Camping, boat-ing, hunting clothesline and vene-tian bines Perfect for tent ropes, light anchors, deer cord, trot lines, crabbing, etc.

BRAIDED CORD White or Olive Drab. 3/16" diameter 550 lb. Test. 30 and 50 ft. lengths as per foot.

BRAIDED LINE Office Drab, %" dia., 1000 tb. Test. 20, 30, 50, 100 ft lengths. 21/3c per foot NYLON FISH LINE Proven best by experienced Saher-

men. Heat stretched. Will not kink, twist, or unravel. 25 lb. Test, 300 ft. Reg. \$1 NOW 50¢ per speed NYLON ROPE 3 strand, Olive Drub, Test.

50, 100, 200, 300, 400, 500 ft. apools, 1s per foot. 7/16 dia. 3,000 lb. Test. Any length from 20 to 60 ft. 18e per foot.

NYLON WEB STRAPS with sturdy steel buckle Perfect for luggage 6" DADOES with 3 blades and 5 chippers. Reg. \$12.95

OUR PRICE \$4.44 ppd.

Straps, car tow-bres car carrier straps boat trailer straps etc. Will do the work of metal chains at far less cost. 1" wide—3 000 b Test 10c per foot. 12 wide—6 000 ib Test 16c per foot in 5, 6 8, 10, 12 foot lengths.

Genuine, Hi-grode, Carbon **Tool** Steel Services and BRAND-NEW FOR HAND OF

ELECTRIC DRILL Hobbyista' Homeownera! Carpenteral Almost your last chance to get 46 brand-new, carbon tool-steel twist drills for less than 4 4 cents each! Usually sells for much more. You get about 5 each of all most-used sizes from needle-sized 1/18" up to and including '4" Tempered cutting edges easily bits through steel, aluminum, iron, wood or mastic. Each drill harvened und designed to give 1500 dellarge

NEW HIGH CAPACITY INSTANT HEATING WELLER SOLDERING GUN

Single Heat 250 Walt Roy. \$13.95 HOW \$17.95

All models for 60 systes 120 volta afternating current ealy

For all types of soldering and other uses Produces instant heat. Dual spotlights locate work in darkest corners.

Streamined design perfect balance, phenoic read plastic housing gives complete protection and top performance Low cost We let 1 ps are replaceable in a My are chisel shaped for faster heat transfer.

Minimum Order \$1.—Send Check or Money Order.—C.O.D. Plus Postage—MONEY BACK GUARANTEE

SCOTT-MITCHELL HOUSE, INC. Dept. SND, 611 Broadway, N. Y. 12, N. Y.

C 50

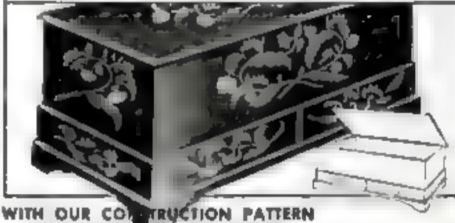


CLYLLIUWER WANDLINE OF BOWLE Owners and for 20 years! SPEEDY SPRAYER gives your work that professional paint huish everyone admires. Sprays paint, enamel, varnish, lacquer, etc. . . . 4 to 7 times faster than hand brushing! Lightweight. portable, uses any , H P motor Improved diaphragm

principle assures clean, oil free air You'll find dozens of time and money saving uses for SPEEDY SPRAYER, including spraying insecticides 2-4-D and DDT, Complete outfit, without motor, only \$36.50

At leading bardware, lumber, and auto supply dealers, FREE—write for bandy booklet "How to Spray."

W. R. BROWN CORPORATION 2637 N. Normandy Ave. • Chicago 35, III MAKE it at home ... with HOMASOTE



YOU BUILD THIS ATTRACTIVE

You build this storage chest in a weekend. Overall size is 11 cubic feet . . . ample space to top for linens, blankets, etc.; two full-depth bottom drawers. You use no blueprints to build this chest. Our simplified East-Bild* Pattern #269 specifies all. materials — shows how to cut such piece to exact size - how to assemble and decorate finished chest like a professional.

The major material used is Homasole, Type RD - one of the strongest building boards you'll ever use - distributed by building materials dealers throughout the United States and in Canada.

NEW! Three litustrated folders with 18 practical make-itat-home suggestions from a room in the attle to a covered patio to a his pond. Send today for your pattern and/or folders. "T M Reg East Bild Pattern Company

H	0	y)	S	OI	E	0	Co	.,	1	Ò	= (Þζ	+	Ø	5		1	e		ונו	lς	4	ì	3		ħ	ī	1	ſ,									
1	C 0	cle	386			1	ľĎ	¢	ß	Ы		3	1	o	d	h	:1	8		1		J	å	Ю	¢	1	ю	¢	1	Pi	u	t	CI	4	 #	2	ij	8
N.	A	MI	2					à										p 1						ı.				4								. ,		,
		DF																																				
C	IT	Y.							h					+					=	4			.1	5	Γ.	٨	Ţ	E	١,	+	+	4					4	ŀ
M	y	lua	nt	HET.	d	Ċ	le	r	'n	ŀ.		+ 4				4		. 4	٠,			-					+	+					ŀ		 			



WHAT'S NEW ABOUT NEW

SHOP

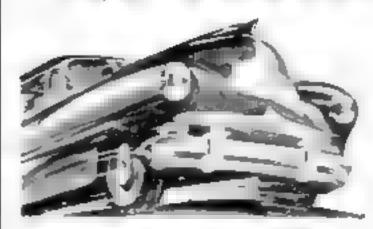
Everything! It's even more accurate, more versatile, easier to operate! See it at your dealer's now. For big, new, free booklet with 20 pages of pictures, data, drop a card to: INUTABLEH, Dept. 256-4, 12112 Cait Rd., Cleveland E. Ohio

LOOKING FOR THE BEST PLIER TO BUY?



CHAMPION DEARMENT TOOL CO., MEADVILLE, PA.

CAR OWNERS!



First 12 Pages Alone of New Auto Book Can SAVE You Over \$86.00!

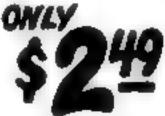
Popular Science Experts Help Keep Your Car's Value Up — Repair Costs Down!

Now ready! "HOW TO TAKE CARE OF YOUR CAR"—big, new "show-how" manual that helps you save hundreds of dollars repairing your own ear regardless of make or model! Simple "do-it-yourself" instructions help you prevent 95% of costly car break-downs! Make many necessary repairs and adjustments at no cost or for just a few pennies! Save on gas, oil, tires, paint jobs, motor and body repairs—everything fully illustrated in 5 colors!

SAVE bundreds improving your car's performance and appearance, modernizing your garage, and making scores of other improvemental

EXTRAL Save untold troubles and disappointments when buying a used car. Buyer's Guide on Fp. 168-172 makes it practically impossible to gat stuck with a "lamon."

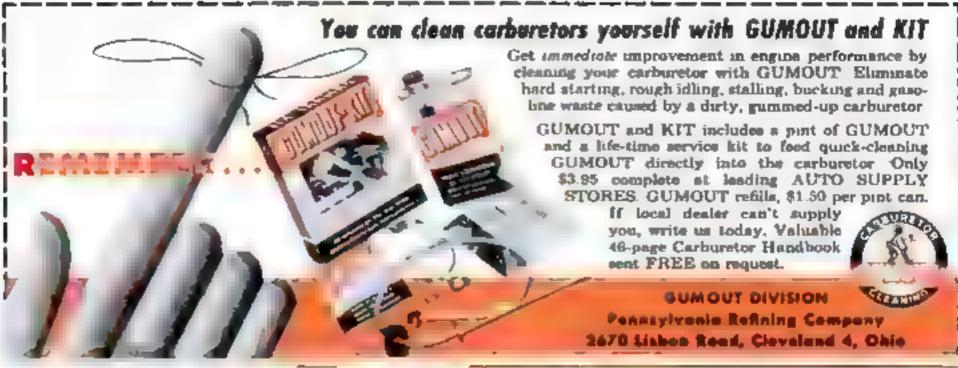
256 BIG PAGES! 750 PICTURES! 851 NEW IDEAS!



SEND NO MONEY! All you do is merely detach Coupon below and mail in now, Enjoy week's FREE trial! Balance of edition going fast; we may never again be able to offer book at low bargain price of \$2.49! Paste Coupon to 2-cent postcard mail TODAY!

POPULAR SCIENCE, DEPT 754
353 Fourth Ave., N. Y. 10, N. Y.
Please send ' HOW TO TAKE CARE OF YOUR CAR"
an edition checked below, I will pay postman \$2.49 plus
postal fees. If not satisfied, I may return book within 7
days for refund of purchase prace.
De Luxe Edition only 50c extra,
Name
Address
Addicas.
City Zone State
Check here if you recurt now, We will pay
all shipping costs. Same return privilege

238 POPULAR SCIENCE



Shrinks Hemorrhoids Without Surgery

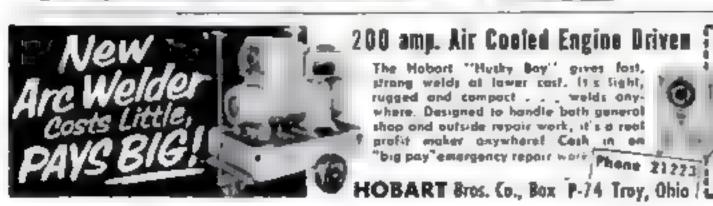
Science Finds Healing Substance That Relieves Pain-Shrinks Hemorrhoids

Science has found a healing substance that shrinks hemorrhoids. stops pain promptly, ends bleeding - without surgery. Doctors report actual shrinking of hemorrhoids. Sufferers say, "Hemorrhoids have ceased to be a problem." The secret is Bio-Dyne® — already widely used for healing injured tissue. This substance is now available in a hemorrhoid sintment called Preparation H*. Ask your druggist for Preparation H. Money back guarantec. "Trade Math









200 amp. Air Cooled Engine Driven

The Hobort "Husky Bay" gives fast, strong wolds at lower cast. It's light, rugged and compact . . . welds anywhere. Designed to handle both general shop and outside repair work, it's a real profit maker anywhere! Cosh in on "big pay emergency repair work"

Check coupon, mail with name and address for complete data. Husky Boy " A. E. We Transformer Type AC We der I Welder for

) Reg El Drive I Hobart Gl ap proved School FREE Welder s Pocket Guide

Sex F-74, Tray, O.



New! Stewart-Warner

MOTOR MINDER



Makes every trip an economy run

Warner's new driving gauge and engine analyzer tells as you drive how to get more miles per gallon—how to get top performance from your engine.

Motor Minder warns immediately of faulty performance of spark plugs, carburetor, valves, timing, rings, manifold, muffer etc. Swivel mounting makes Illuminated dial easy to read from any angle. Simple to install—complete instructions included.

Get it at your dealer's. If he cannot supply you, send his name and address, and your chack or manay order for \$10.95 to Stewart-Warner. Your Mater Minder will be sent to you direct—proposal!

STEWART-WARNER

Instrument Division, Department P-74
1840 Diversey Parkway, Chicago 14, Illinois

Boeing's let Stratoliner

[Continued from page 124]

Appropriately, the company has decided to call its jet transport the Stratoliner. The airplane's immediate predecessor was the Stratocruiser, a common sight in the skies of Reykjavik and Rio, Singapore and San Francisco. There was a previous Stratoliner. It was the first of the U.S. four-engine land transports. But only nine were manufactured, and that was 15 years ago.

When will you be able to fly in the first American jet transport? That depends. The Stratoliner must go through its proving trials. It must be approved for carrying people. It must be built in numbers so that a regular service can be established by one or more airlines.

Project for the "Dream Department"

There are straws in the wind, Captain Eddie Rickenbacker, head of Eastern Air Lines, was so interested in jet transports that he flew to England to look at the Comet. Pan American World Airways has an order in for jets. The dreams department of United Air Lines has been making theoretical jet flights from coast to coast every day for more than a year. Other U.S. transport-airplane manufacturers are planning jet airliners.

It wouldn't be a bad guess that you will be able to buy a ticket on U.S. jet transport by a year from next summer,

maybe sooner.

Meantime, hearken to that drawl out Seattle-way. It's Mr. A. M. (Tex.) Johnston giving sweet-talk to 95 tons of jet airplane as he eases forward on the throttles. It's likely that he's saying to his co-pilot, "Jest you settle back in yore seat and relax, son, because hyer we go!"

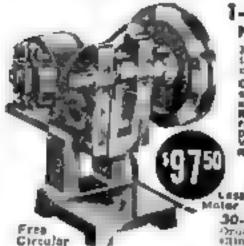
A Moving Question

A little girl, riding on a train for the first time, pointed to some trees and asked, "Mommie, what are those?"

"Those are trees, dear," answered the moth-

"Where are they going?"—Fireman's Fund Record.

CUT COSTS with ALLEN Punch Press



1-Ton Power Bench Type Powerful, Bependahle, Economical

For light work stamping form-ing freeing etc - Metal, fiber or other material

Overall height 171/2" Base tits B1/2 11.7 Ole bed 51.2" AB1 2" AB

The machine of a thousand uses?
Adequate for many lynes of work
now done on arger presses at

30-Day Money-Sock Guarantee Order TODAY Price to 5: Fig. 8. Clinion, Ma Clastades Mater bracket, Y-belt, Rotor puller, less motor.)

ALVA F. ALLEN

Dept. PS CUNTON, MO.





Mechanics cuil them "America's finest."

Sockets and attachments Open and and box wreaches Combination wreaches Complete tool sets

BONNEY FORCE & TOOL WORKS

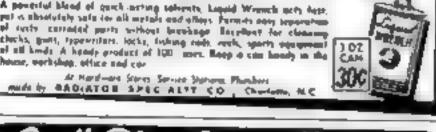
ALLENTOWN, PA.

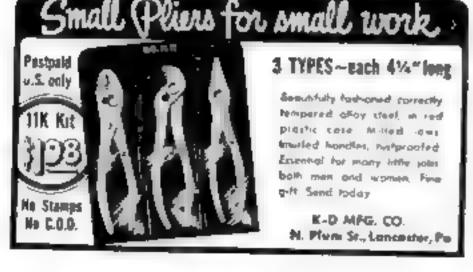
New Johnson Sea-Horse Catalog. Complete with pictures and facts on the 5 great

1954 Sea-Horses - from 3 hp. to 25 hp. Full details on the Revolutionary Quiet Sea-Horse 51/2 and the Electric Starting Sea-Home 25. Write!

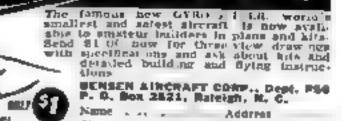
JOHNSON MOTORS, 500 Pershing Rd., Wookegan, IIL











City. ...

CREATEST THRULL OF FLYING!



AMP CHAMP HAND TOOL is an electrician's moladapted for home workshops. Makes completely insulated
aptices and connections in house witing, appliances, auto,
etc. It crimps solderless reminals and connectors. It splices
and strips wire. No tape or solder needed. It shears bolts
leaving threads undamaged. Terminals, connectors and insulators free. \$3.95 postpard. T. W. Berger, national dealer
and consumer distributor. Aircraft-Marine Products, Inc.,
American Bldg., Cincinnati 3, Ohio

	T W. Berger, Inc., Destributer 1319-57, American Bidg., Cocinnati 2, Ohio
with Kill r	Resh me a Champ Tool. I om enclosing \$3.95.
Connectors Insulators	Address

THE BEST GLUE YOU CAN BUY WATERARD

Why tisk glue failure due to changing moisture and heat conditions . . . in any of your projects? Made from resorcin resin. ELMER'S WATER-PROOF GLUE is the anly wood glue packaged for home use that meets U. S. Military Specification MIL-A-397 for waterproof glue. Use it for building or repairing boats, indoor or outdoor furniture, toys and sports equipment. At better marine supply, lumber and hardware dealers. Write for folder: The Borden Company, Chemical Division, Dept. PS-74, 350 Madison Avenue, New York 17, N. Y.

EIMER'S WATER

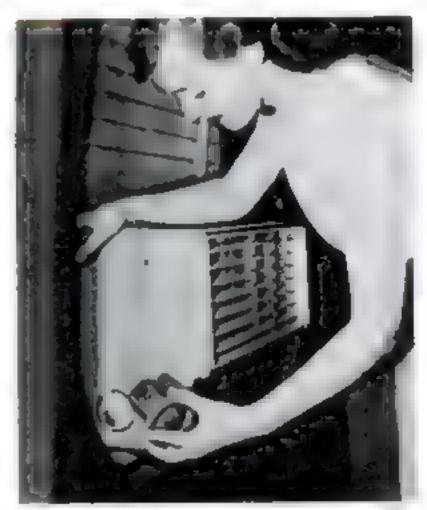
ATERPROOF GLUE

CTRC



Sled Has Underwater Window

A NEW inflatable surf sled permits the rider to float comfortably on the water and still watch marine life below through a specially designed window. The plastic sled is made by the Kestral Corp., 25 Willow St., Springfield, Mass.



Air Conditioner Sweetens Air

This air conditioner dispenses chlorophyll to freshen room air and kill unpleasant odors. The small, removable gadget shown above does the job. It fits into the side of a %-hp. Remington conditioner and may be turned on or off.



See it! microscopie life around you ...

Free 44 page catalog

Hobby microscopes from \$9.55 espable of secing, studying living subvisible mal, plant life in and

around your home.

elementary alide making at home, where to find subjects.

CAPA FREE Send post

ÆAKRO∏

106 AERON BLDG , 4579 BURSET BITO., LOS ANGELES AT CALIF



You Se'l For \$22.00

BUCKEYE SCREEN & WEATHERSTRIP CO. 1378 S. 22nd Street, Columbus, Ohio



 Stows away in 2 easy - to - corry packages, fits into car trunk For all water sports. Used by famous expiorers.

> ready to lounch model

from *159

- Easy to set up in minutes; new snap-lock fittings!
- Unsinkable-inflatable tubes around gunwales.
- Hull of multi-ply robber tire construction on ragged frames of ash and marine plywood
- Trim 17 footer holds 4 adults plus gear
- For paddle, power or sail.

Write for FREE Catalogue

KLEPPER CQ. Dept PS7 1472 Broadway New York 18, N. Y.

Send me free illustrated color catalogue

Address.

If You Make Painting a Hobby-



You'll get a lot more real satisfaction and pride of ownership out of a home that is clean and neat and trim in a fresh coat of paint! Pays its own way by improving your property, too!

Because Archer Pol-mer-ik contains polymerized oil, it gives you a tougher, more durable paint film than ordinary lineed oil. When you reduce your paints with Pol-mer-ik, they brush easier, level better, and give you a smoother, dirt-resisting finish, Wonderful brush conditioner, too!

Handrest single product in your house or shop. Does the job of a dozen specialized products. A few of

POL-MER-IK'S 101 HANDY USES:



PROTECTS MOST EVERYTHING

PRINT postcards like MAGIC



the new Post Master Spirit Postcard Printer, you can reproduce anything

you can write, type, or draw in up in 5 colors -at a small fraction of normal printing costs!

It's fast, it's clean and so easy to use. Prints with Spirit Solution from earbon masters. Uses no messy inha or atencile-Prints with no waste-you get bright, clear copies every time. Ideal for postcard adver-

tieing, church or club mailings, printing labels, lags, and many other uses.

Order yours today from your office supply dealer. If he can't supply you, we'll ship direct on a money-back guarantee.

Master Addresser COMPANY

6508-JJ West Lake Street Micheapolis 16, Minnesele





TUSE FREE WITH EVERY TIRE AT NO EXTRA COST
LOW OVERNAMI - LANGE VOLUME SALES A SMALL PROPITS
ORING VOLUMES 'LOWEST PRICES' WINTER SPECIALS—
WHAT DOGO IS A TIPE WITHOUT A TUBE?
WHY PAY AN ESTABLISHED POLICY OF CAREFUL SELECTION ASSURES YOU MANY
MORE! WE WELCOME
YOU LE BUY MORE! WE WELCOME
COMPETITION AND ONE CAN TOUCH
OUR QUALITY A PRICES

YOU GET WHAT WE ADVERTISE TARE THE 10" DISCOUNT WE OFFER THE 10" DISCOUNT WE OFFER EVERYWOODY 10"/ OH ON EVERY MAY TAKE 10"/ OH TIME

20 MONTHS WHITTEN GUADANTEE 44 83 600×20 3 85 450×20 4 05 700×20 4 31 750×20 3 75 629×30 1000120 1000120

1. eps. 13 - 13 - 13 - 13 - 13 - 13 - 13 - 13
FREE oth Tire PREE with 32 mes, governor FREE
Specialists in Track Tires Selected for Toughest John Tape in View 22 MOS. WRITTEN GLARANTEE 34 MOS WRITTEN GLARANTEE 500=18 \$3 03 475=10 \$3 15 TDG=15 & \$8 45 700=20 \$10 45 600=16 45 93 475=10 \$3 15 TDG=15 & \$8 45 700=20 \$10 13 03 630=16 8 93 670=15 \$15 700=17 \$750=16 10 13 03 630=16 6 703 710=15 \$15 700=17 \$10.35 825=20 \$17 55 700=16 \$15 700=16 \$15 700=12 \$15 750=16 \$10 45 900=20 \$17 55 750=16 \$15 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=16 \$10 45 900=20 \$17 55 750=17
FOR Phila. Send Check or M.O. with this ed-Bept 3- No C.O.D.
STANDARD 834 N. Bread St., Philadelphia 30, Pa

BEYOUR OWN BOSS

ff you have \$3,000 to \$3,500 and would like to be in business for yourself, write, wire or call Tastee-Freez, OVER 800 SUC-CESSFUL STORES now in operation EARNINGS LARGE.

SOFT ICE MILE SOFTICE DREAM

Taxtee Freen is a reg. trade mark E-FREEZ CORP. of AMERIC 2518 W Montrose, Dept E, Chicogo 18, III.

Auxiliary Accelerator Austrory Accelerator Left Foot Gas Padal mokes driving a pleasury. Permits you to refer, and use left or right foot with equal ease. Fits all turn, either clutch or automatic drive.

Guaranteed for Life of Cor on Which Originally Installed

Prive \$4.95 Baltrared to Tax. Order from R. Y. LEHNER, NESS CITY, KANSAS



MAKE YOUR OWN FOUNTAINS, LAKES, RIVERS, WINDOW DISPLAYS

Get real time artium with mitigfule water frimp. Only 42 4" high -- 31 4" wide. Threated for 9 pe or uses 2 a rubber tubing. Blutdy fuelgened a loy meta mounted on rubber, 110 A C - 80 cycle.

1 250 MP Pumps 50 cal use he Complete trady to work Immedials makey back a suscentre Send therk or M O Or send C O D you hay postage Dea ert wanted

CORE MANUFACTURING CO. SMESSES OF MEM JERSEY

250 POWER Complete pestpaid Telescope Lens Kit

BUSSE SALES CO., Hartford, Cons., Dept. PS-23



DRIVERS. STOP Fumbling for Cigarettee MAGNETIC MAGNA-PAK CLAMPS THEM TO TOUR DASHBOARD Only \$1 post pold

Handrama plortic c parette core-per menently magnetized to c ng tight y to your doch Elim nates dongarous fum hing through packets or ourse. When you legra cer, carry MAGNA PAK as a cose Specify red, hive as in thy white. Guaranteed Sand chack as money order to:

ECHTER MARRITUS PRINCES = P. O. Day 1228 - Inchesive L. A. T.

ing Durfft,

Particely on backlash with Office the bullet a state to the tracked for each authoritation seed available the seas called t storestable speed 12 d streetherd performance the mean cutoff but held to but to be the total and to be to the performance of the proof of the performance of the perform perfectioner & bargate las

use 10 DATS. It and remarked extent for the dark to the modern of modern property 20 and 1 the remarked and 1 the remarked 20 and 1 the remarked 20 and 1 the remarked 20 and 20





SEND ONLY \$1

for next 8 issues of famous DELTAGRAM, best home woodworking magazine you ever saw. Packed with shop-tested ideas—12 to 15 in each issue Send 31 (no stamps) to Delta Power Tool Division, Rockwell Mfg Co 504G N Lexington Ave., Pittsburgh 8, Pennsylvania.





SPECIAL OFFER—Only 104 59-Fugo "Tools and Rules" Seek

"The Tools and Rules for Precision Measuring" tells how to make accuracy a habit, shows the methods skilled mechanics use. 200 pictures plus reference tables. Send only one dime. Address Dept. PS.



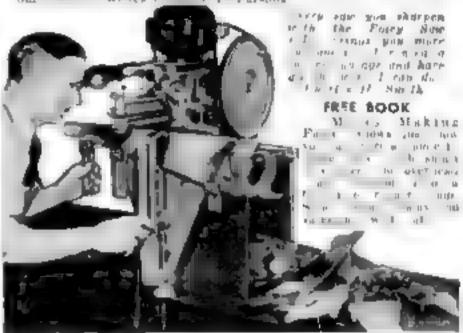
Only 104

THE L. S. STARRETT CO. - ATHOL, MASS., U. S. A.



FREE PLAN tells how to start your own business FILING SAWS

Here is a steady repeat CASH business you can start to your own basement or garage to your space lime and make up to \$10 or \$4 an hour fan can tie band band and cross-cut circular saws on the Foley Saw Piler No eye-strain no experience tree. The foley of the last of him Firey Fiber note out to be a fire of the contractions.



Send Coupon for Free Book

FOLEY MFG. CO., 719-4 Foley Bidg. Minneapolis 12, Minn. Send me free besk. Money Making Facts"

Name:

Address



Build your own fans and . . .

\$20 AN HOUR!

We supply all the precision parts shown (includes baffle cut in 4 sections for easy packaging), along with easy-to-fallow instructions. You do not need a mechanical mind. Anyone, including the ladies, can assemble this for kit. You supply your time. You save enough to pay yourself \$20 on hour. A great idea especially if you need several fans.

S. J. STEWART [ELECTRIC], in business for over 55 years, guarantees every precision part to be of fine quality, giving you a fan of tany, silent, trouble-free operation

Sold with money back guarantee, free circular,

30" BLADE SIZE

124" \$14.251 delivered— Transportation prepaid if cash accompanies order. 15

S. J. STEWART [ELECTRIC]
529 ST. JOSEPH STREET NEW ORLEANS, LA.





PLIERS. CHISELS. PUNCHES. SMIPS. ADJUSTABLE WREHCHES Buy wherever fine tools are sold in U. S. and Canada.

KRAEUTER



AC or DC ELECTRIC WELDER 110 Volte

The "Little Marvel" all-metal welder b-year written guarantes, Welds 14" metal or money back. Repairs tanks, todis, fenders, machine parts atc. Com-plets with everything—rods, unit, eye shield, directions. \$6.45 plus 50c postage. Flame torch ac

ceasory for soldering, cutting brazing \$3.95 complete with carbons, brass ruds, flux Sorry, no C O.D. Buy direct and save ESSAY MFG, CO., Dept. 47, Quincy 69, Mass.

Compiete



HO. AZ CHIFE BET 34.30

X-ACTO, 18C. 1-4) Yen Dom St. Long Island City,

Sand 20s for 28-page Catalog



Worry of **FALSE TEETH**

Slipping or Irritating?

Don't be embarrassed by loose false teeth slipping, dropping or wobbling when you eat, talk or laugh. Just sprinkle a little FASTEETH on your plates. This pleasant powder gives a remarkable sense of added comfort and security by holding plates more firmly. No gummy, gooey, pasty tasts or feeling. It's alkaline (non-scid). Get FASTEETH at any drug counter,

#1 Teposit

TFED precision-built parts, Kit includes photomagram for easy

A HATTERY \$1 50 Roll Ope 1500 by ALNICO MAGNET EAR-

PHONE \$1.45 or 190 or m HEAR ING AID FARSET (\$10 vilue only \$1.95 COD orders accepted with

PRECISION ELECTRONICS, Dept. J., Placerville, Calif.

Factory axrombled

cust only! \$4.95



\$349.50

Finest parton 100-th compressor 3 c.f. to Build your own \$19.95 Also tanks, regulators sie, at big DELUXE POWER PLANT

elph)

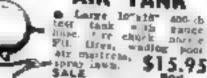
Stany wher plants and governmen on sale

BROAD SWATH WEED SPRAYER

• Leading make goar matiles the unit strain of the strain

• 115 230-y frans.

VACATION TRIP SPECIALS AIR TANK





He intensity dev mile With case colored frame for camp. flat (tres at night Comp. C461

\$4.39 Post FARM-CONTRACTOR LEVEL To " th red (r.p.) \$37.95

SPECIAL OF THE MONTH New Tool Chest

28"=38"=20" Pinest wood rabinet design Four lift out drawers succeived hard ware etc Heavy dur able idea; for hune shops confractors too FOOTBA.

SALE \$21.95 Ppd.

SUPER CLOSEOUT BARGAINS

• Army Mis Soats 10 11 or 12)
• G(am Fibod Light Pee May ad)
• Army Paris C'tange
• Separator (200 amg DC) 115-y AC
• Commissal Pump (100 gpm)

ORDER FROM AD or write for big G tors, sporting goods hand and steers with today!

URDEN COMPA AZE "O" STREET



9 MARIE

Macre ous 2800 4000 m

Marre ous 2000 1000 w 115-r 60 c plant are vis fin-est d cyl. water confed engine

fu le standara Gove cont over

Allenter that you can install easily on any power form mower or gurden tractor powered by a 4 cycle pir-ceoled angine. Prices postpard: \$8.00 (1.27). \$7.25 (3.47). \$9.00 (17). If inside dom, of angine exhaust part measures 13 16" arder 1 2" tilenter | 1 6" order 2 4" ellencary 1 15 16" ander 1" allencer. Berry, no G.O.D.'L.

MAXIM SILENCER COMPAN 122 HOMESTEAD AVE HARPFORD ; COMMI



* PROTECTION - Complete protection from all weather Voluntie corps protocted by Josha.

A SAFETY - Allistent, weigen construction. No elects. Safety glote mad throughout.

★ COMFORT — Pull air-spaced hand lining and door fining. No vibration.

CONVENIENCE - Itali down windows, full spening.

KING WINCHES for all Willes Joseph & W.O. See STORES WORSE, ALSO ALL OTHER MAKE TRUCKS.

KING WINCHES got you through mod, sond, snow, sheek, gulleys and ky slopes when wheel traction fulls. For bolsting and maving machinery, logs and heavy objects where strong, smooth pull an a cable will make work again, soler and more agenemical,

ROPHIC CARS and KING WHICHES prolichly through KAISER-WILLYS DISTRIBUTORS and DEALERS.

KING Galvenized Hand Winch, Tested over 1000 Bo. Copetity 100' 16" cable Cost't rust. All steel construction, with bronze bearings throughout. Mounts harizontally in vertically. Right band or left, Adjustable bandle lever Positive ratchet ofther direction.

Write for description literature

Houston 10, Ferres



Sots 408 touth per misals on band or bend sans 4% to 28 pa al. Stammer and arred action

note touth accurately and

LINCOLN. NEURASKA

the right endy lie looth desokage Does a partect job. Used profit ally by saw shops everywhere and care manufactures from machine guaranteed FAST - ACCURACE DEPENDABLE

BEAVER MFG. CO.

Sow Machine Div. 11-5 AVE. + INGLEWOOD, CALIF



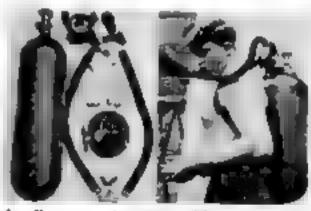
INCREASES



BUILD YOUR OWN DIVING LUNG

As described in July 1953 leave of Pop. Science, New and improved with single lorge tank tested and filled with compressed air for diving up to one hour.

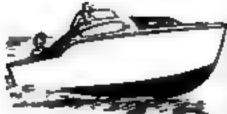
Diving-Lung unit tested by experts for ever 50 hrs., down to 85 ft Kit contains Gue'l High Prist Oxy Regulater 54 en. ft fank, mouth please. ate Our appeal instructions complete ly describe how it's dance You need northing abou except a few aim. ple tools and a few bours to assemble; then it's randy for diving. Write for free felder



As If comes to you -- After Assembly

Gal the Extest Medel F.C.R. New Orleans \$49.75 Order from this ad: Seed M O. or Check, 55 deposit with C.O.D.'s

SPORTING & 520 No. Remport 51, ARMY GOODS New Orleans, 16, La.



THE ORIGINAL PACKAGED

SEND 25: for BIG 1954 CUSTOM-CRAFT CATALOG

Bee the world's finest, most complete line before you decide. Rated tops in design, styling and performance by the experts' Save over 50'11 41 New models. Easy to assemble' Mahogany parts, brais screws, \$49.50 up! Cutaton plus book et 'Boat Selection, Operation & Maintenance' \$1.00 (Refunded on parchase) DEALERS INQUIRE

ARMOR-GLAS

CUSTOM-CHAFT'S MEW SUPER XXX FIBREGLASS

Permanently leakproof your boat! End annual painting and calking forever Easy to apply to any boat, Indestructible: Hundreds of other uses

HEVD 100 for detailed felder and "How-to-Measure Form."
Hend \$1.00 for folder and measuring form FLUS two valuable
bookiets "How to-Use Armer Glass" and "How-to-Rolld your
own Fibergian Soat or Auto Body " Dozens of other Mont.

PATCH and REPAIR KIT: \$5 | Includes generous sup-

ply of Pibergian cloth Super-XXX Resto Pt US plans for maxing Pibergian tool or tackle box. Dozens of uses Repairing patching, etc. DEALER INQUIRIES INVITED.



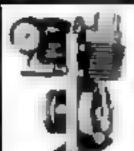
Modern BOA

With FULL-SIZE EASIER TO BUILD, SAVES TIME, MONEY

Over 150 modern plane and patterns with material fata and building procedure, Racing classes, cruisers, inboards, outboards, saliboats, 6 to 26 ft. All materials, fittings, etc. available at "Parkage" prices. Big savat "Parkage" prices. Big sav-ings! Design Catalog tells all!

SEND 354 for 1954 DESIGN CATALOG Design Catalog PLUS best building headhesk, \$2.00

CUSTOM-CRAFT • DEPT. 5 • BUFFAL



Paramount AIR COMPRESSOR COMPARE Price—Features—Servings/

They \$24.00. But) bearing Distance 1.95

type comprehens of resolutions 1.95

pew design. Last to be matched as an at particular observable it no convention at the principle observable it no convention at the MP. BUT delivers MORE at the observable it no convention at the MP. BUT delivers MORE at the observable iterating the proceeding and hundreds other uses in those farm human to himself other uses in those farm human followers 2 and flat are reconstructed in a state of the surple and Air Reputation superameters of money back. We may passage supports 1 in ed. Dent. Inhibit out the context of the surple and the context of the surple superameters of money back. We may passage supports 1 in ed. Dent. Inhibit out the surple superameters are supports and the surple superameters of money back. We may passage supports 1 in ed. Dent. Inhibit out the superameters are supported by the superameters.

ROSERTS ELECTRIC CO., 141 W. Grand, Dept. 198, Ordereds 12, IN.

IT'S DANGEROUS (DANGEROUS) TO PAY LESS For "Family Safe"
YEAR AFTER YEAR, POPULAR SCIENCE BRIDGS US TO YOU



FREE This Pictured Tire Ash With two or more tires

Tires (10 Me.) Truck (8



GODDYLAR

These are Mot Recaps Firestone U.S. And Others

FREE Tube To

Our Prices with new tire 65% DISCOUNT THE PYTCH AMERICA SMOST RESPECTED FREE REPLACEMENT IS DEPECTIVE

YOU RESERVED 32 MONTHS GUARANTEE BOND

GOD 18 14.07.040 18 34 600 18 41 3 77 673 18 650 16 8 07 710 18 630 16 8 8 37 760 18 630 16 8 8 37 760 18 700 16 6 8 67 820 13 700 18 6 8 7 77 630 18 650 17 4.17 700 15 475-29 4.27 533 18 WHITEWALLS 18 EXTRAL FINE RUGGED THUCK TIRES 87 87 27 77 750-16(6) 69-77 700-20 58,77 700 17 6 67 750 20 9 97 750-17 L0-47 825-20 16 27 700-15(8) 7 67 900-20 15 17 700-18 9 47 1000-20 15 17 600-20 7 67 1100-20 15 17 650-20 8 97 11000-22 16 37 DELUZE WHITEWALLS 52 ENTRA \$0,77 \$ 67 16 27 15 37 15 77 15 37

I have personally pinpoint insported every live, as if the every live every l

Military Grip : Not Refreads) 780-20 Super 20 M (4 \$10.27 Regard 1 M (5 12 57 900-16 Regard 1 M (6 512 57 Regard 1 M (6 512 57

ATT Phile., Pa., 11th and Spring Garden St.
Mismi, Pla., 2627 N.W. 7th Art.
Thousands of phipments RushED all over the world. from our store

MODERN LAWN MOWER SHARPENER Service departments leading Lawn Mower manufacturers 1450 the Modern Laws Mower Sharpener One lever moves lawn mower into grinding posttion. Gasoline and oil remain in enging while sharpening no di-man-\$263.00 thing of wheels roler or hand e The Midern is a precision bed kuife grinder no extra grinder to buy. Imitated but never equaled—Compare before you buy PARADENA If it isn't a Modern it can't be Modern (Prices indiect to change without notice! MODERN MFG. CO.

160 M. Fair Gohs . Passions L. Calif.

Men afflicted with Bladder Trouble, Getting Up Nights. Pains in Back, Hips, Legs, Nervousness, Dizziness. Physical Insbility and General Impotency send for our amazing FREE BOOK that

tells how you may correct these conditions and have new health and Zest in Life. Write today. No Obligation. Expelsion Institute, Gapt. 8-5, Excelsion Springs, Mo.

The Original Blank Pistel

Front Mather of Pearl Handle with each EM-GE

in appearance it looks like any fine arount pocket pistol' Compart & la precision toaposset pastor templare at is precision to the doctrined of real gain meet be although with safety catch to precent archetetal fixing a particular and but the cartfulge rest templare for specific events for real purposes home protection dog Italning etc. 31,7 long that \$9.95, through Perfection for talling etc. 31,7 long that \$9.95, through Perfect alignment for the first N Y No police period needed. Section 1 months of the N Y No police period needed.



GIANT 100 POWER DAY & HIGHT

TELESCOPE

Stool and brass tubing construction. itendy to use Two eyeptoces. Instruc-tions for use as a holloscopel! Extra heavy tripod \$7.95 fob factory 400X tolescope makers long hit has brass focusing tube erector 5 lenses and instructions, \$3.05 postpaid.

CARL W. JAMER, Bept. SS, MANORVILLE, N.Y.

Also ADULT t Passander SPORT CAR LOWEST PRICE. Literature

CHICHAID 70 MILES PER GAL, GAS CHILD'S AUTO WITH MOTOR Table 40 A.3. Dept (CSHELMAN CM E7 115 Light St. B. 10 2 Md 113 M Michigan Ave Chicago 1 Hi 7070 No Ipwood Blvd. Los Ange es 28 Cal

SOLDER Accistmed by thousands of Homeowhers, Mechanics and Hobbylits as the welder of 1901 uses. Easily operated from properly wired 110 rolt. AC or DC line. The ideal rift. with a life-long use,... Order foday on 10 day money back guarantes.

FOUR-WAY WELDER CO., Dept. F3-G 1810 S. Federal St. * Chicago 16, Ill.





GOLDEN STATE ARMS CORPORATION

16 BOWLING BLDG., 972 E. COLORADO ST., PASADENA I, CALIF.

LICK SUMMER DROUGHTS!

PROOF! Toilet Tissue Makes Ideal Oil Filter Refill... Costs Only

Inatall Rollif Adopter Plates in your car oll filter and you

can use ordinary toilet paper roll for the filter element! Laboratory tests, thousands of motorists, proved conclusively that tollet paper cleans dirty motor oil faster and better than popular makes of filter elements! And costs only 10c! Now get these advantages with Both Adopter Plotes.

Easily installed Write today for facts,
proof. descriptive literature.

RETLIF CORPORATION, Dept. 125 ~ 915 N. Highland Ave., Los Angeles 38, Calif.



HAVE WATER WHEN YOU NEED IT.

Drill your own wells with a stordy CON-SOL well driller, built for years of service Deep wells, shaloutdoors. low wells or in collars. Law cost makes CON SOL easy to . . light weight

mokes it easy to erect, operate . . opportunities for rental, contracting, resale make it easy to get bock investment.

Guaranteed for 90 days against defective materials or workmanship, Drills through many feet of rock

before hard insert needs renewing. Used by U.S. Depts. of Agriculture and Forestry, U.S. Mavy. For 4" ensings, \$385 F.O.B. factory; includes drill, boiler and 100" cable. Additional cable, up to 300', 34 hp electric mater or 11/2 hp gasaline engine, available at extra cost.

Heavy duty model, for 6" counts, available with gasoline engine, at \$1295 F.O.B. factory. Prices and specifications subject to change without notice.



Write for free literature to Dept. PS-7

CONSOLIDATED INDUSTRIES, INC. WEST CHESHIRE, CONNECTICUT, U.S.A.



Add to Postage

If you can use a pencil you can the a state of the for the for bookkeepers accountants as some influence committeems.

Cost etc., largers bousselved etc. For semon forces highly important. Men a most useful tool. Easy to calculate instantly. Multiplying proportions division roots etc. "Wigh V ston." Clear View Bilds, Fu'll to Rele. A. E. C. U. Cl. and K scatter. FREE 26 gage instruction book on how to get currect free answers instantly without pencil or paper.

Gene Loewy, 545 5th Ave., Dept. 44-S, N.Y. 17

Limit biree rules to each coupen

.22 RIFLE BARGAIN CARBINE STYLE

(GRAND NEWI) 34 inches long

Exclusive with UNITED) From German) bratte of some of the world's Barel hundage and rel flary public, come these superb ciffes has not was felimited 1965 to Thuring a. Germany's great aresus and borde of the famous Masser Can Works Today the plant has been moved to the American Eone and these after are music

to rigid I NITED requirements. Bears the famous I & TED * Seat of Quality' BECALNE this feathers a ghi mode to maged in every detail. One serve take down macrostry Shoots Longs Shorts and Long thing very star and high powered). Has an omatic elector with self-adjusting aport my rear sight and blade front sight Marrel has \$1% lands. Burd throat. Harby per shed smooth work ag bolt action. Amazing accounty at 191 yard range. Ammunition to sendable answhere and rep nerment parts can exact; be had if ever needed. Low ener the end short makes must be our sensational hargain price Supply is limited as 1st so quick ortion is abred 10 DAY MO ROBH TREAL Lise for his days. If and fu r agt after recurs for re-med? Remit \$14.55 Rifls abloped transcertar on collect C U D is require \$2.56 deposit UNITED ARMS CO United Suitding \$043 S. Western Ave.

All the Facts You Need About PORTA ELECTRIC

Mess CATALOG! Hundreds of time and moneysaving ideas for hobbyists, builders, professional woodworkers! New 28-page catalog describes latest. portable electric tools—how they work—what they do-where they save Explains features and uses of electric saws, best manders, orbital sanders, duc-

ge nder-sander polither routees, planes. shapers drille, board granders, chain saws, hedge trimmers- tool accessories Shows what to look for when buying electric tools—how to get most value. Write today Send 10c to cover postage and bandling. Send for your copy NOW!

PORTER-CABLE MACHINE CO., 2687 N. Salina St., Syracusa B, N. T.



Make big money by beilding for PROFIT1 Valuable section shows you how to build and sell roadnide standa, gas stationa, collarges been obsendence John No complicated, expensive tools needed. This one section along makes this the "Big Opportunity" book of your lifetime!

353 Fourth Avenue, N. Y. 10, N. Y. Please and my trial copy of "How to Build Cablus and Rauch Hauser" today. I'll pay postman \$2.49 (plus postage) on delivery. If not delighted, I may setum book within 7 days for full refund. Zobe..... State....... Check here if you comit new. We pay bostoge, Same er/and guarantee.



AT LEADING DEALERS EVERYWHERE!

ASSEMBLE YOUR OWN DIVING LUNG

Save 50% or Moret

FREE Catalogi Underwater dwimming agu jeneal Write being? We furnish the parts and instruct one. Complete out-fits \$38.95 and \$49.85. Write for descriptive filterature.

Ed. Aguada Trag. Co., Boys. L. Dos 4575 Plage Str. 21. Louis, Me



RETAIL PRICE \$123 DO FACTORY TO YOU \$7095

SUPERSHOP includes precisionbuilt 8" tilting table saw, vertical and horizontal drill press, 30" lathe, sander, grinder. 100% BALL SEARING. Write for FREE catalog, full details, trial plan.

POWER TOOLS, INC.

261 YATES AVE. BELOST, WISC.

OCKS table humans. General high speed, few cost Concrete Vibrator Stock Mathine produces 1000 blocks in 8 hour day All sizes and shapes Complete details FREE Mail 31 fer won darful book. How to Build Your Own Concrete Block Home



DAN LURIE Magnetes a Most Mascular Man on to or study his Too "

307 HUNTER ST.,

with 4 courses—low factory prices 50 (b, set \$ 8.48 | 150 lb, set \$20 48 100 lb, set 13.98 | 200 (b, set 25.98 Write for Order by Malo 40% with order bal. C O D

Free Cutates DAN LURIE BARBELL CO. 52-87 Wristol St. Brocklyn, M.Y.





ASSEMBLE WINDOW OR ATTIC FAME WITH

"BUILD YOUR

Everything you need to assemble a number off event window You savE up to 75. Here a unit you get; or attic fan is included SATY Fan Spider Mason e Baden, Rubber mounted Bearings, Shaft But Pulays, Botts and a famous EASI BILD Pattern showing you how to assemble your own low cost cooling as stem in a matter of a few hours. All you furnish is Lumber and 1.4 HP Motor! There's a size for every

10" Couls everage home, 36" 2:10 for large homes, \$10.56 P.P. 14" Site for small homes, \$14.05 P.P. 20" Apt. or officer size, \$12.05 P.P. 10" Apt. or office size,

Send check or money order for immedute shipment postpaid on a money back guarantee! Corollar Free

FAN KIT COMPANY, Box 5842-E, Memphis 4, Tenn.



Building or Modernizing Your Kitchen Cabinets?

Add the distinctive beauty of McKinney Forged Iron Cabinet Hardware

A complete line of quality Forged Iron Cabinet Hardware of authentic historic design. Three finishes -dull black, Swedish (relieved) from and Olde Copper. Beautiful results on either natural or painted wood surfaces. Buy at your hardware dealer's.

SEND TO: AND COUPON FOR BOOKLET TO:

	INNEY MANUFACTURING CO. 1715 Liverpool Street, Pittsburgh 33, Po. PS
Nome	
Address	
Сіу	Zone State

105 POWER SUPER TELESCOPE



Everything for the Astronomer. Hobbyist, Bludent, and Brout In this complete antronomy as super value telescope combination. Not romes ready for immediate use consists of brildent Man 651 105a telescope. Star Explorer map and 106 page book. Discover the Mann. The Manner than the page book. Discover the Mann. The Manner than the mill bring distant objects. people, many stars ships etc 145 times closer All Images arect. The attribity by it triped is equipped with uniteral mount that has a 360 degree horizontal range and 160 degree vertical range at locks in any position with one simple adjustment. The first Explorer map mables you to find any star automatically. This

maryelaus all purpose instrument to procuimed by Scientists as a most unusual devisorment Everyone that has used it is amount at its performance and value it will function the entire to buy at the smaking low price of

Setisfaction guaranteed or maney retunded. We pay all de-livery charges. Send theck or money order to GEPT. PSSA.

CRITERION CO. 335 CHURCH ST., HARTFORD I., CONN.

sensational values

BRAND NEW BURPLUS BURNER UNITS

Tremendous valuet Brand new surplus burder upits Burns while you Perfect for canch home farm boat camp, trailer. Dilucius, ste Burner in [10], diam, weight di jbs Un the approx 15 x21 x10 Consists of 2 tanks 21 x 25 m with the wider seams 3 beass valves 3 are dilucius air gauge to 80 jbs Can also be used as all for compressor or fitled with Hould for oproving Tasks alone worth more than the low low price Balpules weight [17] ba, a sensalions value complete inc.



ALL NEW VICKERS HYDRAULIC PUMPS & MOTORS

rutation \$24.50 as including the state of th

1000 p a 1 H g p m at 5000 r.p.m rated 807 eq.

at 3750 r.p. on retailen r.h. 1800 p. s.f. S.y.p. m. at 3400 r.p. m. rated 410 cts. at 3750 r.p. m. retailen r.h. 514.50 In. 149

HYDRAULIC HAND PUMP 2006 P.S.L. CUARANTEED

Fine for hydraulic press etc. Executional value. Originally cost to Gov't many times its less price to you Used but in good cond tion \$7.50



Typicalic Cylinder - Save 30% | 3.5° bors | 1.2° shaft 21° stroke 31's stroke

BORE HYDRAULIC CYLINDER

Fine for press with above hand pump. 15" about 100 the state to the with 1000 p at input. Only



LOW PRICED GENERAL PURPOSE PUMP

Pumps question water, oil size keeped at 400 G.P.R. output Bu I in relief valve Tou I find bundreds of uses for the fine pump Originally cost the Gov't, peweral limes our low price to you. Just \$7.50

Bend for FREE catalog of other outstanding new and surplus values include a hyd values accreate parts etc.

QUICK SERVICE CO. 800 H. Laimas St. Burband. Catet.



BOOK ARTHRITIS

RHEUMATISM * Neuritis * Sciatica

If you suffer the distressing pains of these diseases after the usual remedies have failed, learn about a specialized system of treatment. This marvelous system is fully explained in the Ball Chair's PREE BOOK. Write Today.

LALL CLINIC Dept. 16 Excelsior Springs, M



Original All Purpose Pump has \$400 fifth camer-ity Sat GPH 78 high or 1800 6 M from 25 well the any 1 5 to 54 ftf motor Flainless steel shall Of less fearing 3" in-DOTS NOT CLOS ON WUST

Postpaid if cosh with order, (Worl of Miss, add 3 or 1 M 25 F RACK OF AHANTEF Larger Cats trifugal Pumps, and Gear Pumps (5 all sizes. LABANCO PUMPS, Selle Mesé 3, N. J.

MACHINE SHOP EQUIPMENT The NEW edit on of the famous Center Tool Co.

Catolog is bow ready! Every workshop though the story Set pages full of lilustration descriptions and priese of the story tools made by best known manufacturers in the You pay the cost of granting \$1.00 We refuse your \$1.00 with page first page of \$23.00 or mars. Frompt duty very on most tools, Send thick or money order today! CENTER TOOL CO.

198 Lefayette St., New York 12





GIANT BALLO

Samples U.S. Gov'l. (New-Overage) NEOPHENE Weather, target balluons For FUN or PROFIT, Great sport in the backpard; or for parties p chica Conres fare MOMEY-MANERS, Loc those bellooms to attract rowds civic evenis conventions, established, trade shows TERRIFIC for high school and rollege PROMS. All sizes are approx inflated size Postage paid un prepaid orders

3 ft. die, 490-6 ft. die, 99c 13 ft. die, \$5.68-20 ft. die, \$5.98 deals pisase add sales fas.

AR ASSETS DIV. VOLUME SALES CO. Dept. 5754, 3930 Sunset Bird., Los Auguite 29, Calif.

NEW LIFE GUARANTEED FOR OLD TV PICTURE TUBES!



BODSTUBE SAVES TV PICTURE TUBES!

Save up to \$40 over new picture tube cost! Weak, washed out, fading pictures from old, long-used rubes become light, bright,

times longer! Amazing new BOOSTUBE, secret of professional service men, gives them new life! Anyone can install - no wiring needed! Absolutely Guaranteed to please, or purchase price refunded! State TV make, picture size, model number if possible. Send 34 95 TODAY for postpaid BOOSTUBE and instructions, Satisfaction completely GUARANTEED!

ALLIED, INC., DEPT. A

2503 N. 3RD ST. . MILWAUKEE 12, WISCONSIN

NEW SANDER L-I-G-H-T-S WORK AS IT SANDS!

Only SYNCO '900' SANDER

gives you at this but in work light most sowerful reciproration earder miter atended and guar enterd against burn out during owner ablication of the state of the

SYNCRO CORP. Bugil 2-84 DITFORD: MICHIGAN, U.S. A.



PREE '900' CATALOG



Just diet any of 40 cuts. Perallel, clean, no sanding! Leave on saw for regular cuts. For 1/2, 1/4, 1/4 and " greors. At deoler's or order direct! and for free beaking

WARREN DADO WASHERS CO.

Dept. 47 P.O. Box 98, Detroit 2, Mich.



Easily located with new Lightweight M-Scope Detector Superior performance, lowest price, monthly payment plan.

PREE LITERATURE FISHER RESEARCH LAB., INC. CALIF.

PALO ALTO POCKET PISTOL

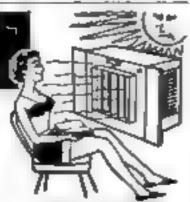
NO POLICE FERMIT NEEDED Looks like regular can by pocket pielol
Precision machined of regular gas also be
close interaces by German patentials. Has
als shall magan as In double act on and
subly surposestic Positive pately eaten.
Ideal for home prefet on, specing events, then
trical performances, dog training etc. 4" home
Wright His et 10 DAY MO might fresh. I
disastisfied cloth for refund C O D a front of
\$100 deposit. Cash profess are puid.

LIFELIKE—SHOOTS BLANKS



UNITED ARMS, 9843 S. Western, Dept. 8P-381, Chicago 28

In minutes with sprew driver, plices, through date, rest confetent. Adjustable features direct uir. Powerful Egylep, 115-s AC sheded polit motor Balanced fan. Docky Mountain supus filters. Eleg-free sirty trough. Adjustable side sants for anual easy window-fit. Bress sector lag valve, Inggla Huitels, plya sanancian, SII tobing: Sand S.E.III m.n. or abady legisan C.O.S. plus shipping, Pay lett amount; save phipping syste, Supply Stated - ACT 102901



WEATHER MEDICIANTS 2913-8 Guston Are.

Bulles 4, Texas

MOTOR GUARANTEED FOR ONE YEAR



Norld's Largest Selection: EO,000 Home a LOWEST PRICES!

everything for your car, truck custom styled car or hot rod al at rock bottors PARTS: CUSTOM-STYLING EQUIPMENT:

FREE valuable Safety Chart showing how them.— tooks — tooks valuable Safety Chart showing how shocks — tasting parts.

CAPALING OR ADD

J. C. WHITNEY & CO., 1917 T.T Archer Ave., Chicago 16, M.

J. C. WHITNEY & CO. 1917 T-7 Arelier Ave., Chicago 18, Rt.

Rush giant 1954 Catalog of auto parts and accessories at lowest prices. I enclose Se to cover part of root, which will be cred-

tract in ma in inf. in ht third-dt-illide in det.
Name
Address
City State

FINE IMPORTED MULTI-TESTER

STOP GUESSING!

MEASURE IT WITH A MODEL TK-30 TESTER

A procision instrument—SPECIALLY DESIGNED FOR:

Electrical Rupairs

Tolevision

Zadie Service

Appliances

Meters

Generators

Ruggedly Bulli Large, easy to reed scale

ONLY

Propold

 Household Wiring Automobile

Electrical Lystams

148 Pages packed

with Items like

these ... all at

Lowest Prices!

Auto redice — Multiers, pipeo -- Enginesi, jaartu --

Transmissions — fires, tubes — Fuels: -Springs,

* Shop

Amgteur

 Professional Mulded behalite care.

HANGES:

Valle AC & DC 0-15/180/780

0-150 Milliampores Resistance:

0-100,000 OHMS Smooth sore edjust-

mout

Complete with Batteries, Test Leads and Fine Leather carrying case.

A ancessity for any wali - equipped shop or tool kit.

ORDER NOW

for immediate shipment

Nome:	UNITED INSTRUM	ENT CO.	
Address:			

Citys			1111.

OXYGEN REGULATORS

AN6004-1 AND A12



Cylinder 24x31/4 1/2" opening	\$2.50
Cylinder 181/2×31/4 1/5" opening	\$2.00
Valve Vi''	\$3.00
Tee Fitting.	\$3.00
Flutter Valves	.40 and .50
Mouth Place	.45
Hore 2 H	4 H
Clamps .	15

USED GOVERNMENT SURPLUS

Terms check or 50% deposit and belance C.O.D.

FREE CATALOG

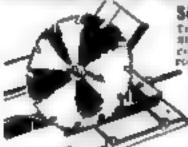
M. A. NORDEN SUPPLY COMPANY

273 N. Washington Ave.

Mobile, Ala.



BOY hamilesw like new! What A e bit a hardened steel rol are teeth are finished and \$XX/TTY WASTE HELD HT All teeth rul and saw tuns true and equoth Jy and jostfactions \$2.30 postpaid Pres Hierature



SHARPEN YOUR CIRCULAR SAWS

The Hight way on your own sew table
sharpens rip, cutoff, bollow ground and
combines on blades 6" to 10" Sawe riay
round with correct beset Prevision made
pany to use IT ANTIED by \$88.85.
In: stee 4 of Canding wheel

Inc. oten 4 of Condition of an amount of 10° condition of

OR POSTPAID

A. D. McBURNEY, 5908 Hollywood Bivd., Hollywood 28, Cal., Dept. 3-43





"I HAVE EARNED \$1520AH HOUR"

mith Science's New Midget Miracle, the Presto Fire Extinguisher, says W. P. Wydallin, Ohio

Many others ' cleaning up '- so can yout Amazing into new entinguisher onds fires fast as 2 accoming Guaran and 2 i years! So is for myoallift on y til set white for PHEE Sales Ett. No obliga top, til you want a regular Presto to the as a despotate of acts \$2.50 Money back I/ you wish) Merito Industries.

SHARPEN ANYTHING Jestacellas

New you can sharpen haives, arisand go iden trans instant

professional this
sharpens instance of fasty is a stret inc.
Sharpens instance element

sharpens instance element

classic fit is needed in edge Automorie Addres

there Ar is no. 13th e effect is registed Won't

mar on time edges. Art formerisateful in adold in a
glass cut er is no edges are low orige of fit in the register

that is there on a it must then reary to any root knotses push,

that is the mar on a it must then reary to any root knotses push,

that is the mar on a it must then reary to any root knotses push,

that is the mar on a it must be then the post of the formerisate push.

00.00

HEW! GEIGER COUNTER WITH LOUDSPEAKER!

- High sensitivity probe.
- · Built in battery checker.
- . Low-price long-life hatterler.

Mora funtuenn' Worte far Batails!

TECHNICAL ASSOCIATES Dept 187

YOUR OWN SMALL HOME \$750



Save on rent, mertgage payments. Sulid your own home in only 14 days. 4 complete rooms and both. Finished in

modern coment stucce design. Plans, drawings, instruction \$1.00 Pad. Money back guarantee.

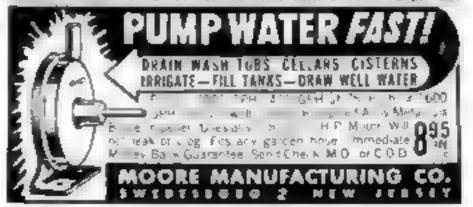
No C.O.D. IREE expension plans

MODERN BUILDING DESIGNERS

49-8 W, 44th St. N.T.C. 26



OVELTY MARY 59 & Oth Street New York 3 N Y Drill 264



MACHINED PARTS READY TO ASSEMBLE MODEL 120 FANKIT MINISTER

■ FOR HOME -FARM - SHOP!

20"ALUMINUM BLADE WITH STEEL HUB

4840 CUBIG FT OF AIR PER MINUTE

- RUBBER MOUNTED BE ARINGS
- COMPLETE Y SELT DRIVE
- STEEL FAN SHAFT & COLLARS
- ALL HARDWARE TO ASSEMBLE

● ALL YOU NEED IS ANY 4 TO 12 KP 725 RPM MOTOR A SCREW DRIVER AND 20 MINUTES TIME TO ASSEMBLE THIS WONDERFUL HOME OR SHIP PAN KIT QUALITY AT LOW CONT!

ANT SAME AND THE MOST AMOUNT \$5 95

Send Check or M.O. FO S Port Make 15% October on CAD

A.E. BOGG MACHINE & TOOL COMPANY BIT JEFFFROON ST JEFFERSON CITY MO.



AMAZING, PERMANENT MAGNETS—WILL NOT WEAKEN! NON-ELECTRIC In the state of th **明1共101 明共在的ET GEMPARY 3340 0.W. 27th Ave**



WOODERAFTSMEN'S

144 page ENCYCLOPEDIA

bank of every conc. salve would working term and tools. Full of How-To-Do-It information, illustrations, projects and ideas, Homestic and imported woods, inlays, panels, etc. Send for your copy today Biggest 15c worth ever offered.

CRAFTSMAN WOOD SERVICE CO. Dopt. 87, 2729 S. Mary Street, Chicago D. Illinols



GIANT IN POWER DAY & HIGHT TELESCOP

and in that one Situal

SUFFORK SCIENCE SERVICE Dept. 01-7, Riverhood, N. Y



SAMSON FIBER-GLASS BOWS THEY DON'T BREAK

THE WHOLF FAMILY CAN USE THE SAME BOW

EATSON - Flow Street Services Madaginia, Sq. MANUSCOLL Shortened beproprinting as Matters & Marriery Archery Funds Phys

L. E. STEMMENT CO., PLANCE VILLE L. L. MINE TORIC Making Source & Among the page 40 years

flansjen, Pitter sluor sv. 24 G ster turn orching mount on lauch lenek or floor wand Truck braced sheel Ex gress col-

legt 300 c 510s. #48 50 ng*



Hes. 67 (M) 15" capite by (6 gauge, 40 to , 22) 50, 18000 BENDER 11x3 58 50, TURING BENDER, 31" 1", 58 00, THEARS THE 10 ga. Alert, 514 00; 24" aquarting and a fit og shoer. 24 ga., 10 ga. asuminum, 518.00, New 32" Vice Brake, \$14.50, P. Paud

(Immediate decleary, Order cash or C.O D., or small (or folder)

VYKE MFG. CO., 5-2439 15 St., Denver 11, Colo.



A gleaming white sealing compound—partect for replacing loose or broken files, filling cracks in woodwork and around sinks, basins and tubs—patching plastic, coromics, furniture, picture frames, Many other uses! Moisture-preaf, heat-resistanti-

Just squeeze tube. Applicator tip is built in for quick easy usel Get D-F WHITE WONDER Sealing Compound now—at leading hardware, paint and building supplies stores. Always ask for D-P compounds—they're easier to usel

The Dicks-Pontius Company • Dayton, Ohio Alexandria, Va. • Decatur, Ga. • Dalles, Texas



Make Money Manufacturing Concrete Drain Tile



Magnifacturers of concrete drain tile are to the driver's seat Why? Because their basic costs are not burdened by freight, distribution and breakage costs—items which the clay tile people have to pass along. Net results concrete tile can sell for less, yet show a generous profit.

The market is big-and getting bigger Not only because of increased form drainage, but also because drain tile are needed in home building, reclamation projects, highway construction, and many other purposess.

Tile made on the Champion are autitanding in quality dense, strong, uniform and truly round. All mies up to 12" diameter. Basy to make, because the Champion Machine is simple, compact, and requires no skilled labor. Business is a low-investment opportunity, with equipment available on terms. Write for catalog.



CONCRETE EQUIPMENT CO. 521 Ottowa Ave., Holland, Mich.



WAR SURPLUS BARCANTS



SENSATIONAL GENERATOR BUY!!

Famous Nevy NEA-S Generator. Combinether At Do T, of At at the -1 th V DC builder of V 10 Ap n. 2 come the generators to 1 that't yet to at we are exact a territ age or a fideal for those, farm and she if it are charts by hickory with to AC tide lot as e can be a ciffin widing and open and was applied for writing has been a first a first and open and open and was applied for writing has been a first and one was a first and one will be seen as a first and one will be seen a first and one will be seen as a first and one will be seen a first a first and one will be seen as a first and one will be seen a first and one will be seen as a first and one will be seen a first and one will be



SPECIAL CARBON PILE TYPE VOLTAGE

REGULATOR to go with stone zeneralar I at nions of a discrept a year set note night as a discrept and construction of an analysis of the set of the set

MUY 'EM GATH -- SAVE 35.45! Generator & Regulator together \$30.

SENSITIVE ALTIMETER in 10 Ft Increments.
NEW Fairs a more to 10 35 Mill ft is to a st.
No curs. Travella is a notice of own sensituabe NOW GNAY \$43 98 PREPAID



MICROMETERS by two phased perchapon energy are to etc.) in give tory ate. Att. Perk (17 on \$2.25 to 1.27 cap. \$3.50

PRICISION GROUND SQUARES Product a engineer a Squirer Accuracy Framentonia. Mrs. ov Weight a Mucro Shameld, Eng Square transaction of a content of the Square box Brate S W Francisco of neglinic cont. 27 \$2.25 37 -52.25 47 52.75, 57-53 87 -53.25 87 -54.25, 107-5 \$6.28, 2" \$6.29

Send 25¢ for big catalog that a commercial No my trader or core as a COD

AIRBORNE SALES CO. INC. BEPT. PSTS4 8501 Stellar Brive, Culver City, Calife

BUY FROM MANUFACTURER



F 0 8. N.Y.

28 COMPLETE WITH 14 HP MOTOR A.C. HOY STEEL FRAME-TOR-RINGTON BLADE GUARANTEED 5 Yrs. Nema Rated 8050 C F M. EASY TO INSTALL & ASSEMBLE

For Use in HOTELD FACTONIES, etc.

If you cannot visit us send for Fan Parts and Electric Motor Catalogue

Send Check or Money Order C O D. send \$5 deposit

Aibin Machine Co. 730 bit Ava., N.Y. 10, N.Y. 425 W. Jofferson Ave., Detroit 26, Mich. 1529 Vine St., Cincinneti IQ, Ohio

FULLY GUARANTEED SPECIALI DEDUCTIO % ES COST ON & OR MORE TIRES!

tong by toro ton FIRESTONE store makes E very tire selected unit

FREE TUBE ON REQUEST | Described for your enfety with PASSENGER TIRES | WHITE WALL TIRES S) EXTRA HIGH GRADE TIMES QUARANTEED 12 MONTHS 800x16 4 14 700x16 9 14 3216 10 84 823x20 14 24 850x16 4 14 670x15 4 74 3216 10 84 900x20 13 34 9 650x15 4 14 650x20 7 84 750x20 0 84 1000x20 14 14 8 700x15 4 84 700x 0 8 7 750x20 9 84 11000x20 16 14 2

AAA PREMIUM GRADE GUARAN EED 18 MONTHS

21 01 20 34 21 90 570×18 6. 18/330x18

MILITARY

AA Guaranteed 12 Months-900a18 10 69 1000420 18 98 750470 10 98 1100420 21 96 AAAGUARANTEED IBMONTHS 900x1814.88 0 750x20 15 48

New Trend Spor. 24 Mes. 600416 (A) 6.98 9 9 6 700:15 750:20 24 98

Largest stock of used 1 res in the Kett, Thousands of satisfied customers. Write for Free Catalogue.
MONEY TROCK OR CHECK WITH CHUER,

PYRAMID TIRE CO.

1333-35 North 5th St. Dept & Phile, 22, Pa.

PLYWOOD BOAT KITS



TAFT MARINE WOODCRAFT

636 39th Ave. N.L. Doys, P\$

Minneapalis 21, Minn.

MILLER Knee Action BOAT TRAILERS and BOAT TRAILER KITS 300 to 1800 LBS, CAPACITIES

\$74.50

& Up, Tox Inc. ACCESSORIES, TOQ. QUALITY proved by MILLIONS OF MILES.

Sold on MONEY-BACK GUARANTEE, SHIPPED ALL OVER THE WORLD. Write for folders and prices.

MILLER COACH CO. IRVING, TEXAS



NYBRAULIC POWER TRANSMISSION RIABLE SPEED



it has induite Speeds 0 to 500 Heveres Automatic Overload Protection: Ad untable Torice up to 180 inch pounds 44" input and couput Shahe it will hamilte V4 to 11g il i Mrs or a see measures 71g | long 7" bigs 01g WIND VALLE OVER BOOD A 17% Deposit Feb. Chienge

DIRZRIS MACHINE SHOP "P" 1423-25 52nd Ave., Cicoro 50, 611.

FIREARMS & SWORDS

You don't want to miss our new thrill-packed catalog. Fascinating background and flustrations of 1800 authorities pieces Except onn to use in hard-to-find items. For your 175 page catatog = 29 a mp v send 50c to cover postage and handing with your name and address

NOBERT ARELS, Box PS, 860 Luxington Ave., New York 21, N. Y.

FOR THRIFTY FOLKS **MAKES HOME** LAWNMOWERS REALLY SHARP AND SMOOTH IN MODEUTE A MONEY MAKER, TOOLET

Just hold the brush and furn the crank while the special compassed does the work. Quickly and easily attached to sharpen hand or power mowers, NOLAND JR, KIT, includes Hand Crank, Collet, Eatro Size Bushings, Compound, Brush, and Instructions. \$4.95 prepaid, No C.O.D. Money both guarantee.

MAKES A FINE UNUSUAL GIFT

MARCHS MFG. CO. .

19039 Morces Ave.

Control 13, Mich.







MAKE EXTRA MONEY

MATIONALLY ADVERTISED HAND & POWER TOOLS : Stanley, Millers Falls, Plumb, Diseton, Wise, and hundreds of others.

Fell Taus last Time but Taue SAAk Money for your Industrial A Institutional Life Me investment Required, Send it for Dealers Card and receive 128 page Wholesale Catalog at no site charge. If required on find purchase of cits hell Life are not last a applicated for Hall Ward Co.

Dept. P. S., 100 Market St. Phila, 6, Pa.



ALL EXMAUSTS

NEW! EXCITING!

JET EXHAUST CUT-OUT

Now your car can sound off those exe ing distantly tomes were care-tral ed morningcally from your dash is and I became your exhaust the sigh species better or muffler without rethes need of Money \$2.95 East a most of mack grantester. Processed.

E-Z MFG. CO., 3314 Marvin Ave., St. Leuis 14, Me.



DELUXE MIDGET 1" RADIO CONTROL \$9.98

COST RASER OF PERSON NORS AR RAIL DO NOR BOTT AREST DEFAULT OF SECTION ASSESSMENT THE OF THE MISSEL OF STREET ASSESSED.

RADIOMODELS, BOX 34, DEPT P BALTIMORE & MARYLAND

oney in a SHAV



TELEPHONES



Desk Stand Style

Slightly used but in excellent condition

Many Volumbio Uses Inter-House Phones House to House to Barn, etc. Loud Speakers Mitrophones Educational Purposes, Toyo, atc.

Cums comp. etc ready to me \$2.75 w. it wirl g diagrams included. \$2.75 In U S.A.

TELEPHONE LAMP KIT with illustrated instructions for making Beak Telephone Lamp including all parts therp, hippies push switch, cord plug, etc.) \$6.50 Ppd. (Shade is not incoded)

MICROPHONE, Dept. X-1204, 1766 W. Lent Ave., Chicago 26, III.



Pertuble Power for took, lights

Carry them to any spot for taker saving, plug-in electric power. Light weight, air-cooled. To 10KW Gasobne-driven. (Model shown—07AH 750 watts A.C.)

Electricity for cabins, resorts

Bring conveniences of electricity to any remote spot. Use regular 115 volt A.C. appliances and equipment, 400 to 50, 000 watts. Gasoline-engine-driven

Marine Electric Plants

En oy elect ica, conveniences affoot Instate below steeks. Compact, imouth design, 400 to 3,000 warts, Gasoline driven.

(Model shorn-MKH, 100 to 1,600 matts)

Write for Folder! 🕳



2942 University Avg., S. R., Atlaneage IIs 14, Minn.



EARN YOUR OWN KING MIDGET. We want rider agents to demonstrate and sed the World's Lowest Priced Two Passenger Automobile. Pully assembled or bolt together parts 35 there is no dealer near you send 25c for detailed fiterature with device price or \$1 reclanded first orders for this plus actus, assembly book and service manual.

MIDSET MOTORS MANUFACTURING CO. ATHENS ONIO





busule Out muna Case Soc extra NO RISK THAN ted team to TOT OFFER 3043 S. Western. Dept. PT 9916. Chicago 20. DEALERS

Paint STRIPES with New "PAINT PEN"!

Makes Straight, Curved or Parallel Lines!

Just fill glass vial with any color paint. Use like a frantam pen to stripe farniture, bikes, autos mode planes, tays linoicum, wall board Secut fu, clean crisp results every time, like professional painters. No experitime, like professional painters. No experience needed to draw straight curved circular or even y spaced paralle. Incomplant or even y spaced paralle. Incomplant contents the paint or curamic underglasses. Faints on wood glass plastics mutal fabrics and paper. Lasts a lifetime. Only \$1 postpak? Attaching the with tip for 1.16 inch. New New C. C. C. C. a. p. 16 on 1.16 inch. Stripe C O D spius postage Used by Industry Order your Pant Striping Fool TODAY!

New! "DOUBLE-STRIPE" MODEL Only \$2.95

Newest paint striping invention Makes pour le stripes - one wide and one narrow or two wide or two parrow at the same time. Or adapt quickly for wide or narrow sing a stripe. Makes 5 combinations, PARE-Send post eard for complete informs 20 DK tion.. or order now.

DEALERS

Master Paint Striping Tool packed in Display Cartons of I dozen Fast profitable seiler Write for discounts.

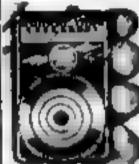
Attention Al Bomo Craftsmen!

New Paint Striping Tool gives "professional" results revery titos. pen An untquie guide heeps lines atmight High three Justy may in Bahr curve or of freehand designs Address beauty Souhad look to everything you pain? Soud \$1 new.

WENDELL MFQ, CO., Dopt, 2.[4234 Lincoln Ave., Chicago Lo, Minole

6 Other Complete Tools
Complete tools for 1 51, 1 22 L 64 E 54,
5 32 or 1 Sinch stripes 41 Sieach Ententips 75c on COMPLETS KIT with
ALL TIPS 15 06 (A set 4 tip, may \$1 00) All tipe interchangeable.

POCKET NEW AMAZING finally Works-Amail as a Pack of Gigarottes!



THE THE SECTION OF SECTIONS OF THE SECTION OF THE S TO BE PERSONAL 1 11 12 24 1515 F 1 Y 11 CH c comens Eral Fuh 46 SEND ONLY \$1 00 Di a Di BLF

TO PPS F ROMES MIDWAT CO Divipal

NEWSST TAROUT RIFLE - 22 IDEAL FOR SMALL DMAG

ECONOMICAL SAFE-NON-TOXIC ACCURATE-CONVENIENT PRACTICAL Easy to operate - No spring

recoil - No pumping Uses low cost Sode Cartridges Cal Zi Renjamin H.C Pellets and Darts.

Benjamin CO2 WHITE FOR FEET HEBSTHATED POLOLE OF ALL MODILS CONTAMIN AIR RIFLES AND BENJAMIN AIR FISTOLS Gus Pietols 852 MARION 51., 87, LOUIS 4, MD. W.S.A.

Also Available



Red Devil Tool

But your FREE capy of "HOW TO FEE BROKEN WINGOWS. MAIL COUPON TODAY

Red Devil Tools, Popt. 126 130 Call Street, Irvington, N. J.

HAME	 	
ADDRESS		

TONE.

2014

12 MODEL "AUTHENTIC REPLICAS" START YOUR COLLECTION TODAY!

Dott Cobra 30

Colleggion medicalens German Luger (Jee. Briston ahlan

Ja: 13 Italian Brevettets German Mauser Japaness Sambu Span & Mos e) Be'g om Automatte Berman F.36 Frontier 44 Cols

Colt 43 Automatle 2656 fushion Ave. a Reproduced in Actual Size, Design und Salance.

Mode of Solid Cast Aluminum

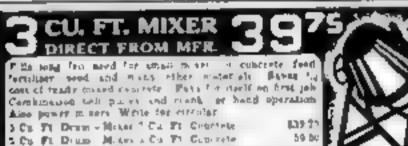
· Finished in Gun Metal Stock "He-Mon" Traphies for Den,

Rumous Room, Cobin, Etc. DNLY Send Cash. Check or Money 5700 (In Calif add 3 % Sales Tax) Z vecto No Canada Orders

LYTLE NOVELTY

Long Beech 10, Callf.

postpaid.



UNITED STATES FORCE AND FOUNDRY CO. CONSTRUCTION PROFESSION MV. PURASET MAN PERSON **NEW, IMPROVED CALCULATOR** FOR WOODWORKERS and 25c losseatly gives information on lumber,

pails, concrete mater, painting materials, ere Convenient, simple to read, Just ses dial for and specifications, so convert linear to based feet, and bit sizes for screws. compare characteristics of woods. 6' dismeter heavily vacuished cardboard. Send 25c, an stamps, please to Greenier Tool Co., 2127 Columbia Avenue, Rockford, Illinois.

BUILD YOUR OWN FAN Que-place cost aluminum

propollers for cooling and Policies Unput shed Bore

Filled Effect Chicago Strong Carlos Car physicis in him blocks rehaust fan fearges, sie Tleature we to for election Add P% for packaging and shipping dhipped ELOPPENBORG ALUMINUM FBY., Bopt. PS-S4, Davemport, Town

Wrought Iren Logs, Block Finish Prices are for set of 4 legs, screws included Shipped propeld, Money back Guerantee
HAIRPIN
Complete Ber-B-C Complete Ser-S-Q 4.70 A

Brott Hamburgers, Frankfurters, Chops, Steaks, etc. \$6.00, 10" diameter

Other designs upd since. 100 Rems SEND FOR CATALLIG CIRCLE METAL MFG. CO., 4268 E. Pecific Way, Las Angeles 21 Catil.



10"

Enjoy I wheel drive per speed extra malenge, delte **BIR**2 S HETTER DE C a rep 4 wheel HIM F. traction with WARN 275 BS. Change 2. wheel or hark to seconds with ingertip con-tro. Front and assembly stonds at in 2 wheel drive-ends drug at the bilibrary cuts from the sent torrelates gas unleading to I to p.g. For Wellys sop Douger \$24 Do pr. also Maplard Hab for Wellys \$30 to Indice \$23 00. Land Hub for Willys \$30 % limite 22-30 William River \$21.00 pr., Automatic Hub for William \$22.00 pr. all ppd Money back quantities Dealers or tirect. Write for failer for WI 30

WARN MFG. CO., Mirerton Buz 1964-152, Septile 16, Wash.

Reading time: 3 minutes to lown how to

- cut engine wear up to 38%
- prevent less of power, compression
- save 15%-25% on oil ... without ever changing your oil filter

This Gadget is Worth \$320,000,000

...and I Discovered it by Accident!

by Albert Wells

I T ALL STARTED the day I got the bill \$214.36 for an engine overhaul—and I had only 28,000 miles on the carl

I told my troubles to a neighbor-a hibrication engineer—told him how I'd always changed oil every 1500 miles, changed filters every 5,000 miles. His answer floored me.

"You've been wasting your money," he said. "We've spent millions developing oil additives that keep carbon, gum and abrasives from damaging your engine. Your oil costs about 15¢ more a quart because of those additives. Yet oil filters on the market today are made of rag or paper—they soak up additives like a blotter. The more often you change oil filters the more money you waste!"

"But don't I need a filter to take the impurities out of

the oil?" I asked.

He took a deep breath. "This will really shock you. Engine damage is done by abrasives 10 to 40 microns in size (a micron is .000039"), Your oil filter can't take them out because rags or paper can't be packed tight enough without stopping oil flow when the fibers soak up oil and expand."

Isn't there any kind of filter that does the job it's

supposed to do?"

No, except for the porous bronze filters they're making for supersonic aircraft. And you can't buy a filter like

that for your car."

I asked myself: "Why not?" Next day, I tracked down the outfit that was making the filters for aircraft, and got the answer. These porous bronze filters were made by fusing together millions of tiny bronze balls. Non-absorbent, they didn't remove additives, yet they removed abrasives in the 10-to-40 micron danger zone. Could they be made for automobiles? Again, the answer floored me.

LIFETIME FILTER TESTED IN CARS, TRUCKS, BOATS

Test models had already been used in cars and trucks

A dealer and distributor network is now being furmed. to handle demand generated by advertising and editorial features in national magazines. If you can qualify, you can be first with the most exciting automotive product of this decade, to win new customers and build a substantial business. These valued franchises are not being sold; they are awarded on the basis of ability to grow with us. For complete details, write or wire: Continental Manufacturing Corporation, Dept. FPS-7 Washington Blvd, & Motor Avenue, Culver City, Calif.



for millions of miles, proving the porous bronze filter: Never needs replacing, 2. Saves the quart of oil thrown away with ordinary filter packs. 3. Increases engine life.

Trouble was, almost the entire production was being

absorbed by military and industrial users.

That day I went to work on the biggest job of my life: setting up production of the Lifetime porous bronze permanent filters for cars and trucks (an estimated \$320,000,000 replacement industry).

NOW TO GET A LIPETIANE FILTER POR YOUR CAR

Try the Lifetime filter on your car for 2 weeks: If it isn't all I say, you get your money back; if you keep it, you're through buying fitter packs-the Lifetime filter is guaranteed for 10 years.

For complete unit, including once (install on any car in 10 minutes), send make, year and model of your car and \$12.95 (we pay shipping).

For conversion kit, which replaces your present filter pack with Lifetime bronze, send make and number of filter and \$6.95 (we pay shipping), NOTE: a few cars have full flow systems, conversions kits for these are \$13.95.

Or send only \$2 deposit, pay C.O.D. charges on arrival. But doit today-don't waste another cent on filter pack replacements!



Complete Lifetinio Filter: Bis any car.



Lifetime Conversion Kit; replaces ordinary packs with permanent bronze element.

Permanent Filter Division, Dept. FPS-7 CONTINENTAL MANUFACTURING CORP Washington Blvd. at Motor Ave., Culver City, Calif.
Ship 🗆 complete unit for
make, model, year of car
conversion kit for
make and number of present filter
l enclose 🗆 \$12.95 for complete unit (\$18.95—chrome)
36.95 for conversion kit (full-flow, \$13.95)
13.83)
\$2.00 deposit; send C.O.D.
Name
A J.J
Address
CityState



ORILL, SAW REAM ... metal, pipe, wood, plastic, Transite, etc. Use with any electric will, also drill prote, lathe or milling machine. Orlife our starting belo-apper part of bit is used to out new or ream eircles, every squares, or serolls. Engy is, sporate, ideal for carpenture mechanics, electriques, plumbers, habbyints, many others. Abrasive resolutant high apper steel Flutes ground is no old Will willstand severa sentimency use without breaking Rocherpaned at so charge. Taken place of as to \$50 in books % diameter, 2" cutting seriless, tetal length 1". Available in three types—All Purpose: Wood, Money Motal Specify type needed Set of 3, \$11.50. Dutaits on request Shipped same thy Money back quarantee. Dualer (equivies levited DRDER NOW' SEMD CARM, CHECK OR MONEY ORDER

INTERNATIONAL TWIST DRILL CORP. 618. Wyandstip, Ros. 107, Kaneas City 5, Me.

Manufactured and distributed by

Build Your Own Mower with

FREE PLANS LOW FACTORY PRICES DIRECT TO YOU

With Triangle's precision made ready to use Kita Parts and Engines, you can easily build as fine performing power mower at you could buy ready made at a Big Saving Our Free Plans fulds you Choose from 4 build-it-yoursalf Kita 4 models of complete mowers with or without engines, and 4 models ready to assemble at a Big Saving 18 or 20 meh stres in 2 and 4 wheel models—bet or direct drive. Our guarantee protects you and our LOW PACTORY PRICES DIRECT TO YOU save you up to 48 Write TODAY for your set of Free Plans and complete descriptive hierature complete descriptive hierature



SPECIAL

LOSE!!

TRIANGLE MANUFACTURING CO., Box 5-31, Fort Scott, Konsos





Super Coulity - Rogged Performance - 15 Months Jasored Service 40014 51 61 670415 53 65 70016 65015 3 62 47016 4 05 710415 630818 4.35 7001 7 3.95 760415

Suprama Quality - Herbing Finer - 36 Mantits Insured Service 700+10 \$12.50 710+10 J 15 30 750+20 J0 17 50 425+20 21 50 11.95 710×20 J 15 50 11 95 750×20 J0 17 50 16.45 #25×29 Z1 50 10 95 900×20 19 95 11 23 1000×20 20 45 10.95 #100×20 21 25 11 75 1000×22 21 95 11 95 1100×22 27 75 12.75 1100×24 25.85

MIDLAND TIRE SALES

Speedy abluments on Mail Orders, F 0.8, Chicago Insurance Philory sent with each order Deduct 1985 on orders for Z or more used these. Send CHECK of MONEY ONLYED No COD's. 3701 S. Harmal, Dopt. 55-27, Chicago 9, 111.



NOW AVAILABLE FOR THE FIRST TIME! na To to be No Office of Letters UNDERWATER SAFETT FACTOR IN FIG. SHAPE ONLY SEE STATE OF COMPANY OF STATE OF STATE OF COMPANY OF STATE SKINDSVING CATALOG 16 to a men page of more distributed for a series page of more distributed for a series for a series and the first more distributed for a series for a series and the first more distributed for a series of the series and the series of the series markly bank Daily 15c Order All Three-Save SOc - Special Compliantion Price \$1. BIVERS SUPPLY CO., 1150 Wilmington Bird., Wilmington, Ca 16.

BE FREE FROM TRUSS SLAVERY

NOW there is a new modern Non-Surgical treatment that permanently corrects rupture. These Non-Surgleaf treatments are so certain, that a Lifetime Certiheate of Amurance is given. Write today for our New FREE Book that gives facts that may have you painful and expensive surgery, and tells how non-surgi-cally you may again work, live, play and love and enjoy life in the manner you desire. There is no obugation. Excelmer Huram Clean Dopt. 3705 Recolour Springs, Mr.

Free Catalog • 3000 Novelties

Seed for amaging catalog of noverties, five animate, extenting supplies habilite, tunggalers, planes à boate, soems, magic tricks, join articles anusual seeds gudget floresevers, sameves, optical gunds prejectors, movies, jucky jewerry restigious newsties, disgulars, movies, jucky jewerry restigious newsties, disgulars, musical instruments slamps coins puzzles fortune, radios, sete à bits accessories, tolescopes magnifiers, combants, smooters' gadgets artists supplies printing sets, one mother, thousand, tillfulds. Newstan, guns, effirques books, games, plants, etc. Send coin as stamp for postage, 20th \$561714 \$ CO. Dani, 128 JOHNSON SMITH & CO., Dept. 828 Detroit 7, Michigan

BUILD YOUR OWN

AND DEHUMIDIFIERS-FOR HOME OR AUTOMOBILE

FROM JUNKED REFRIGERATORS-FOR \$15 COMPLETE "Install-It-Townself" KIT for Auto - ONLY \$164.79 This is t contains at rotation put and for install as my requir lines to your car that as equal to aparty and perfectioning of units not ing turnly or must have buttered of dos are frend for instruction by he for further external to to

SEELEY PRODUCTS CO., Dapt. 81, 3716 Behmont, Chicago 18, 11.





The miour out easy and out or variable CLEASTY · Use mileur outdoor variate · closeup and ong d stance lug 7 cl sed 141; a mu an extended.

MOTACHEAPLY MADE TOT TELE-SCOPE. But a pi sitmetal chrome in MADE TOT TELESCOPE. But a precision
altimetal chrome intercers: I VITAL
free intercers: I VITAL
free Actromatics are COATED assuring
needle charp tewing Price includes handsome
carrethe case Made in Japan Unconditionally Quaranteen,
Try for Dr dare if not amissed return for morediate before Cash
orders postpaid C O D a require \$3.00 depose United SinocuLAR CO. 3043 \$ Western Ave., Bept. C-3615, Chicago 20, Illinois.
Opulars wanted.

This One





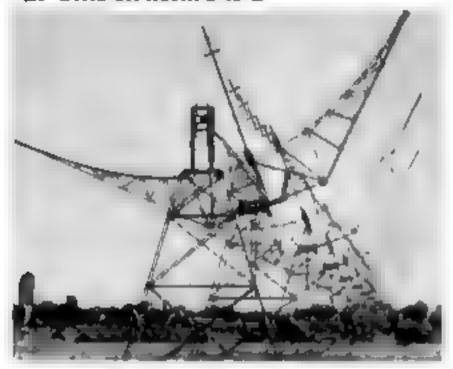
How Much Did You Learn?

By Stanford E. Taylor and Helen Frackenpohl

Washington Square Reading Center, New York

Now you can sample how much you remember of the useful and interesting information packed into this issue of POPULAR SCIENCE MONTHLY. Answers to the questions are printed just below the quiz. After each answer is a page reference to the article on which the question was based.

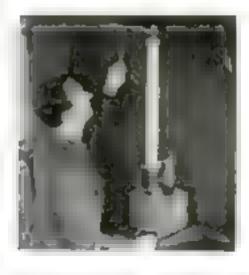
- With only 110 hp., Plymouth rates highest in its field in
 - a. breakaway torque
 - b. power-to-weight ratio
 - c. top speed
- 2. This structure is a



- a. UHF television transmitter
- b. radio telescope
- c. dirigible dock
- 3. The intense pain from a sting-ray wound is caused by
 - a. the unusual depth of the wound
 - b. bacterial infection
 - c. venom from the sting ray
- 4. Washing your car with household soap is inadvisable because
 - a. it's too strong, may remove paint
 - b, it takes too much work
 - c. it's hard to wash off, leaves a scum

- 5. In taking pictures under water, you should stay within six to 15 feet of
 - a, the surface
 - h, your subject
 - c. a safety line
- The new adhesive cements make laying tile a breeze, except where
 - a. there is too much moisture
 - b. imperfect work may be too visible
 - c. the surface is not sound and level
- 7. Motels now outnumber hotels throughout the country by
 - a. two to one
 - b. three to one
 - c. four to one
- The mysterious pockmarks on windshields this spring were found to be caused primarily by
 - a. vandalism
 - b. ordinary road damage
 - c. temperature changes
- 9. One square yard of a new sunpowered battery would yield
 - a. 70 watts of power
 - b, 50 watta of power
 - c. 10 watts of power
- 10. Proponents of the air-cooled Franklin car claim greater motor efficiency because it runs at
 - a. 180-212 degrees
 - b. 280-320 degrees
 - c. 350-450 degrees

Assumers, 1 a-p, 104, 2, b-p, 78; 3 c-p, 117; 4, c-p, 132, 5 b-p, 150; 6, c-p, 182, 7 a-p, 112; 8, b-p, 55; 9, b-p, 71; 10, c-p, 92.



NEXT MONTH ...

Spectacular Stunts with a Homemade Tesla Coil

If you are one of the hundreds of readers who have expressed interest in building a modern Tesla coil, don't miss the August issue of PSM. Step-by-step photos will picture the construction of a rig that will perform colorful and exciting feats of electrical magic.



FACTORY- SAVE up to 85% direct from MASTER MECHANIC

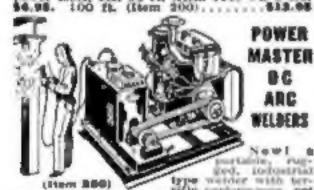
WATT PLANT 110-120 v. 60 c absolutely best made - exclusive dynamirally balanced armature; heavy windings develop up to 5000 watt overload for mo-tor starting. Said

JET STEAM MASTER



Now, a new super efficient portation esteem generator that provides five steem at 100 lbs. pressore in 60 seconds from a cold start! The first quality steem blaster ever offered at this low price. Instantly cleans sirely presse, steet, rust,

EXTENSION CORD



at a price hundreds of deliars less than you'd expect. Senter model made for years of trouble-free, continuous service. Righ especity DC welding unit enables you to tackle any job with confidence—easily welds saything up to 2" plate using from 1/16" to by cois. Builtin stabilizer and roading system makes are easy to strike and hold. Dual control rheostat provides low heat soldering, braning and weighing from 30 to 200 areas. provides low heat soldering, brazing and weld-ing from 30 to 300 amps. Complete with in-structions, guarantee and triple v-best or fiat pulley. You can pay more, but you can't bey a better welder.

COMPLETE POWER MASTER (Illustrated above) powered by a 14 hp., air couled Wisconsin engine, Wt. 480 lbs. (Ilem 280) Com-\$449.50

walles only out drive with your tractor, leep or gas engine of 14 HP or more. Item 08a, Wt. 110 lbs. \$113.50 WELDER ONLY-STANGARD MODEL. Fame a

er, ground clamp. Said\$10.50 MASTER

PORTO-POWER 1500-1700 WATT PLANT



115/120 v. 60 cyc.
AC. Push button start.
Fowered by a 4 BP
Briegs engine.
This plant comtones the compactorse and easy portability of the
smaller plants, but
tas a high output
to handle heavier
starting loads.

for charging 12 v. batteries. An ideal standby power plant for operating lights, same pumps, oil barners and communication systems. Perfeet for contractors and line crews.

Fectory Special Price...

MASTER-LITE
2500 Watt Plant
110/120 v. 50 cyc.

AC. A powerful
plant, naggedly constructed and pet de-signed for day started by rape of built-in 12 v, elec-tric pash husten starter. Built - in winding to charge battery. Pewered



by a big 5.10 lif livings engine, complete with all accessories, includes control box, vott-VI. 225 B. Rec. price 101 100 \$329.50

1000 3500 WAYY PLANT flore 10.

5. 60 eye. AC Belt Drive, Wis. \$399.50

Heavy duty only for belt drive. \$399.50

PORTABLE LIGHT PLANTS Ideal for your comp. cottuge, temilar ur haat!

PUBLIC BUTTON START
115 V. GO cyc. AC
Powered by a reacted
2 HP easy starting Briggs engine, No just plug in end speciale. Pleaty of cur-rent for any oil burn-er, freezer, brooker, lights,

In the Tool I have the terminal from the Tool I have the Tool I have the terminal from the terminal fitter than the termi LITTLE GIANT-350 WATT (liem 313)

redice, amail power tonic. Sector lights, we make fully sufernation write for the share light plants. Write for details, we make all sizes up to 25,000 Watts.

HEATING & VENTILATING FAN

(Hem 10) Easily installed in furnace pipes, Forces even beat to all rooms. Over range re-moves bitchen smoke and mours.

CONDITIONAIRE VENTILATING FANS

bug money installing own exhaust fan, Erforce own exhaust fan. Er-ficient propeller type biade moves huge volume of air mutetly and effortiessly. Beavy weided frame - pre-drilled for easy installation. Just cut opening and bolt in place. Continuous suty mutors. Ideal for attics,



motors. Ideal for attice, restaurants, caraces, bares, chicken beuses, etc. Control manualty or with thermostat.

Blade Opening CFM

16" 1845" 2023 19 lb. 18" 1945" 3000 27 lb. 5

20" 2114" 4100 30 lb. 5 365a 365b 59.00: 18", 10. 511.25. open actionalically, 16", wt.10 lb., Wt. 13 lb., \$10.28; 20" Wt. 14

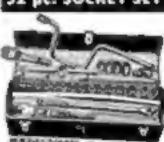
230 v. 60 eye. A.C. A
brute of a power
plant with a
rugged 14 hp.
Wisconsin engine.
Plenty of electricity for ranges,
water heaters,
freesets, bumps,
machinery, stc.
Affinds both 110
and 220 volts, ideal

Affinds both 110 and 220 volts, ideal where heavy current is needed. Wt. 500 lbs. Easily worth 2005. With self-starter, Factory price ... \$645.00 Same passed, but with trank start, \$525.50 Generator and control box only, belt driveo. Use your own engine or tractor. Wt.4345.00 240 lbs. (Hom 103) Factory price 345.00

TON HYDRAULIC PRESS

A tremendously powerful hydraulic press, capable of exerting 18,000 its. pressure. Pays for itself many times over-straightening best consecting ross, king pins, crack-aharts, males, link pins and hars - or pushing out frozen bearings and bushings. Developed pressure under preoped pressure under pre-rice restrai sod visible at all times on accurate gauge, Complete with both large and amuli shvils and visible figs to straighten any kind of curve or bend, illem 404; Wt. 110 lb, Actual list price \$3.65. Our special \$69.50

52 pc. SOCKET SET



guaranteed non-breshable sockets made by times

The section of the se



inrage evaluate of air for heavy duty mervice. For paint agraying, infialing truck & mate three, greating & the hundreds of other jobs done by compressed air. Platen type, 2" term compressed with bigh strength alloys and precision tenrings. Tank, 12"x24", 2100 cu. In. cap. Injurposed with automatic awards that starts and stops motor to maintain desired pressure (up to 150 lbs.) and check valve, safety valve, gauge, shut-off valve, 20 ft, air hase and tire chuck. Beautifully balanced on tall bearing whosis and ribber tires. Don't take chances with used or surplus equipment. Our compressors are factory new and are guaranteed SAFE. Low factory prices. With LS RP., 110 v. AC motor.



Pressure Campe, Image 0-160 fee.

14" pipe thread connection, 2" face.

Check Valve, solid lorence, 200 lbs, pressure
works in all positions, 14" or

14" pipe threads, (specify).

Pressure Regulator, solid brace, sid. 1/4" pip face. \$1.50 Pipe Pressure Switch for pumps and compressors, 0-83 lbs., \$5.95; 0-170 lbs. with untuster of EC, \$10.95; 0-200 lbs. (5 HP), \$12.95

shove but with single rheostal for heavy metal.

THERMOSTATE: BARN type (Fings 40"-60"), Pressure Switch for numps and compt welding only, (Rem 56.1 See Sec. 170 lbs. 56.05. ATTIC type (50"-80"), 0.31 lbs. 55.25: 0.150 lbs. with under the state of the MECHANIC MFG. CO. Burlington, Wis. 0 PT. ≥9H

BATTING AVERAGE

with the boss?



Are you still making a hit? Are you up for the job ahead? Here's a sure way to score in any league!

If your boss is like most, he's casting his critical eye on everybody these days. He wants to know how you stack up. Are you making good-or marking time? When the changes come, will you go up-or out?

This is no time for casual resolve. What you plan to do six months from now may be too late. You've got to prove your worth-NOW!

FOR REAL JOB SECURITY—BET J.C.S. TRAINING

The quickest, surest way to impress your boss is to show him that you're better equipped than the next guy. And here's where L.C. S. can go to bat for you!

I. C. S. training is approved training! Leading companies know it - and use it! At your request, your boss will get regular reports of your progress with I. C. S. More important, he'll notice the immediate improvement in your work.

LEARN IN YOUR SPARE TIME—SET YOUR OWN PACE

L.C. S. instruction is personalized instruction. No interference with other activities. No slow classmates to hold up your progress. You forge ahead as rapidly as your time and ability permit!

I. C. S. Courses are practical, up-to-the-minute. What you learn one night, you apply the next day. You get bedrock facts and theories plus everyday know-how. Graduates get the famous L.C. S. diploma -recognized everywhere. "I got a break over more experienced fellows because of my I. C. S. training." says M. A. D., Suncock, N. H.

QUICK WAY TO TEST YOUR EXECUTIVE ABILITY

Successful men know how to make decisions. Don't put it off! Mail the coupon today!

2 FREE BOOKS Free, litestrated catalog outlining opportunities in the field that interests you. Also 36-page, pocket-size guide to advancement, "How to-Succeed," a gold mine of helpful tips. Just mail the coupon!

For Real Job Security - Get I. C. S. Training!

L.C. S., Scranton 9, Penna.

Mant cost or obligation, send in ARCHITECTURE and BUILDING CONSTRUCTION Air Conditioning—Refrig. Architecture Suiding Contractor Suiding Mointenance Corporate and Mill Work Estimating Heating Pointing Contractor Plumbing Reading Arch. Sheeprists Steemstring ART Cartnowing	AVIATION Astronautical Engineer Aircreft & Engine Me BUSINESS Adverthing Bookkeeping and Acc Business Administrat Business Correspendi Certified Poblic Acces Creative Salesmanchi Federal Fax Letter-writing temprer Managing Small Busi Office Management Retail Business Mana Sales Management Stenographic-Secrete	and the oping Jr. chanic counting ion once onting io once once once once once once once onc	CIVIL, STRUCTURAL ENGINEERING Covid Engineering Highway Engineering Reading Struct. Blueprink. Sanitary Engineering Structural Engineering Surveying and Mapping DRAFTING Aircraft Drafting Architectural Drafting Electrical Crafting Mochanical Orafting Ship Deafting Ship Deafting Structural Deafting	Forementhip Industrial Supervision Leadership and Organization Personnal-Labor Relations M ECHANICAL, AND SHOP Gas — Electric Welding Heal Treatment Melatiory Industrial Engineering Industrial Engineering Industrial Supervision Machine Design-Drafting Machine Shop Practice Mechanical Engineering Duality Control	RAIL ROAD Air Brakes Car Inspector Dissel Lacomotive Locaristive Engineer Suction Foreman STEAM AND DIESEL POWER Combustion Engineering Diesel—Elec. Diesel Engil Electric Light and Power Stationary Fireman Stationary Steem Engineering TEXTILE Cording and Spinning Cutton, Rayen, Woolen Mig. Finishing and Dyeing Leam Fixing
Fashion Illustrating Magazine Illustrating Show Card and Sign Lethering	☐ Traffic Management ☐ CH EAST RY ☐ Analytical Chemistry ☐ Chemical Engineering ☐ Chest. Lab. Technical ☐ General Chemistry ☐ Natural Ges Prod. & ☐ Petroloum Engineerin ☐ Plastics ☐ Pulp and Paper Maki	r Trans.	ELECTRICAL Description Engineering Electrical Maintenance Electrical Maintenance Electrician Contracting Lineary HIGH SCHOOL Commercial Good English High School Subjects Hethamatica	Refrigeration Shoet Metal Worket Tool Design Teolmaking RADIO, TELEVISION Grectronics	☐ Domestic Refrigeration ☐ Marino Engineering
larre			Age Name Add	rays.	
lly	Zone	State		Working Names	



Halps Your Children Gat Ratter School Grades



Having this full classroom salso ginhs signt or sare own hums will give year children on undertable ad-vantage to their in matching history, or respectively for

remine of history of history of history of history of history or present of the foreign of the foreign of the family will have it to the family will have it ter of

Toye Guide to More Funding Learning With Your Glube, Validation of the character of the cha

FREE / White Supply Lasts!

BIG OYER SPEET

LEGUES

Shipping Wt.

Mearly 7 Hrs.

Just imagine that handsome globe in your home Your guests will admire it. You'll consult it almost daily for a better understanding of world events. Your children will gain through better

Shows 5.410 place names You'll find it easy to pick out states, nations, rivers, railroads, ocean currents, deserts, ete., etc.

You Must Act AT ONCE

Only by special arpossible to get a quantity of these magnificent globes. First come, first served. So mail coupon below TODAY!

This Coupon Entitles You to the Giant World Globe - FREE!

SEND NO MONEY! PAY POSTMAN NOTHING!

You Also Get This Big Smach-Hit Bost-Sollar



THORNDIKE-BARNHART DICTIONARY

"Best dictionary in mrintl' Sterling North.
300,000 facts about
menting spelling proninciation, origin, use
of 80,000 words, 700 tilus, Publ. \$4, 12,95.
On Take Gas of
THESE East-Selbert

ANNAPURNA, by Maurice Herrog, Exciting first-hand account of how a few brave men commercial a 3-mile-high mountain, Publ. Ed. 45.00.

THE OEVIL'S LAUGHTER, by Front Preby She chose to be his "lover"—then deceived him with his worst enemal Publ. Ed. 23.50.

where strategy to the property of the property

Here's All You Do To Get Your FREE GIANT WORLD GLOBE:

Simply Mail Coupon WITHOUT MONEY-and your big WORLD GLOBE will be sent to you immediately as a New-Membership gift from the Book League of America. You pay nothing, owe nothing— except for the shipping and more than 61c; of this handsome gift! WITH it comes your first exciting Club Selection—either the best-selling "Thoundike-Barnhart" Dictionary, or any one of the other books described on this page.

You Choose Your Own Sept-Sellers! Thereafter 2. you will CONTINUE to receive Your OWN CHOICE of the finest new novels of romance and adventure by famous authors like Steinbeck, Maugham Yerby etc.

3. book you select each month may be selling at retail for \$3.50 or more. You pay only the Club's bargain price of \$1.49 plus few cents shipping—a saving of up to \$2.00! Think of the saving of up to \$2.00! Think of the saving of up to \$2.00! Think of the saving the twelve books you'll take during the year! Think of the enloyment you'll get from your FREE CIANT WORLD CLOSE!

NEED NO MOREY!

Mail coupen for FREE GLOGE today! Supply limited. So rush coupon NOW-WITH-OUT MONEY-and enjoy this generous gift without delay! BOOK LEAGUE OF AMERICA. Dept. 7-PS, Garden City, N. Y.

Mail WITHOUT MONEY to BOOK LEAGUE OF AMERICA,

Dept. 7-P3, Garden City, M. Y.
Please word me PHLE (I will pay shipping and banding only not in exceed Gle)—the brand-live giant Reposite Wellist GLOBE. Over 3 is, around, shipping witnessly 7 the, 432 mg, inches of map surface, 5.410 place names. Also send Files saluable book. "See the World on a Globe." Formal me as a member and send on as fur first Cipt Selection the best-setting book checked between

Thorndike Burnkari Dictionary 🛅 The Davil's Laughter Kha Me Again, Stranger Assaper us

The best-selling books I choose becoming the either the regular Selections or any of the other popular books described in the Club's monthly "Review." Although the same rities may be selling for 63 or horse if retail, I am to pay only the Club's special law members price of \$1.49 cach, plus few cents shipping charges and I may caused my subscription at any time after lawing twelve banks from the Club, No does to pay no further coul or obligation.

Obligation. NO HISH QUARANTEE: If not delighted, I will return the Giole and first Selection in 7 days, my membership will be especified and I will pay tooking. MR. MISS

(Please Print Plainty)

ADDRESS.....

ZONE NO. STATE the transfer of the start of th

TUPALUL: A new educational program for the whole family..sponsored by THE NATIONAL AUDUBON SOCIETY



In summer, the snowshoe rabbit is the same color as his tundra home. But when snow comes he begins to turn white-and soon he's camouflaged again!



Here are two unusual "look-alikes". One is the ow -and the other, the spectacular Calico Butterfly which often alights upside down with his "owleyes" showing! Nature "protects her own" with fascinating camouflage!

A fascinating NEW WAY to bring the WONDERS OF

into your home! MAGNIFICENT TRUE-TO-LIFE COLOR PRINTS EXCITING AS A VISIT TO A GREAT MUSEUM!

What will these unusual creatures grow up to be? You'd never guess!

if you enroll now THE CURRENT ALBUM

RIGHT NOW is an excellent time for you to find out about the National Audubon Society's revolutionary "Museum-at-Home" program. Mail the coupon below and you may have ABSOLUTELY FREE OF CHARGE the current set entitled Camouflage in Nature, including thirty fascinating nataral color prints plus an informative album in which to mount them. (Value \$1.00)

This generous FREE gift will demonstrate to you and your family how much pleasure and knowledge can be derived from this new plan.

A Much-Needed Program

How satisfying it would be to learn Nature's mysteries in the personal company of friendly naturalists, such as those of the National Audubon Society!

These scientists would open your eyes to wonders from all

You assume no obligation when you send the Enrollment Coupon at the right, and receive your FREE CAMOUFLAGE IN NATURE SEL YOU may resign your enrollment at any time you wish. But we teel sure that once your family has become

over the world-including those you can discover in your own back yard or park!

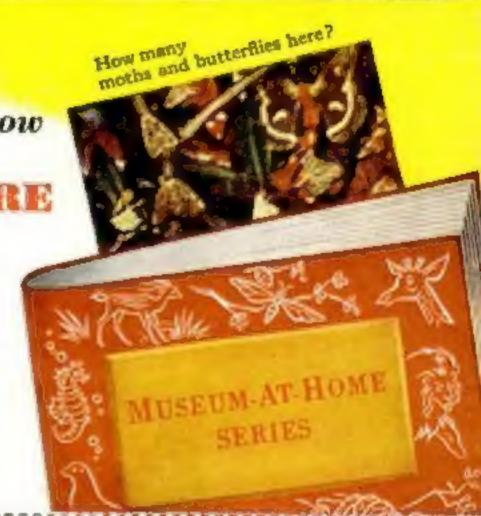
An Amazing "Museum-at-Home"

The "Museum-at-Home" plan was developed to bring to your home the closest possible equivalent to this kind of thrilling personal guidance. Each month a fascinating new topic is selected, and you and your family explore it together with the National Audubon Society's experts. For each topic, a collection of about thirty natural color prints - usually brilliant true color photographs - is issued, together with an album in which the prints (already gummed for this perpose) may be mounted. An interesting fact-filled text explains your "Museum-at-Home exhibits. And the total cost is very low: only \$1 for each set, plus a few pennses for shipping.

Your albums and color prints will rapidly grow into an "armchair museum" of Natural History - a "nuncum" visited again and again by the whole family

Begin with this FREE Set; withdraw whenever you wish

acquainted with the plan, you will want to continue these delightful monthly "visits" for a while. That's entirely up to you. However, we urge you to send the coupon NOW to get your sample set FREE. On millies are limited. Act at once.



NATURE PROGRAM Dept. P5-7, Garden City, N.Y.

Please send me IRIE the CAMOUFLAGE IN NATURE series including 30 natural color prints, and an album to mount them in, plus informative text. I understand that you plan to Issue a new Nature series each month in cooperation with the National Audubon Society, for only \$1.00 each plus a small charge for shipping. After examining my FREE set, I'll notify you if I do not wish any others. I may cancel my subscription at any time I wish without further obligation. You will immediately send me, also without any charge, a handsome maroon and gold color case for my albums.

	gorden prints
ddress	
br	ZuneStale

(Same offer in Canada: address 100 Ross) St., Toronto 2, Out.

Good sale in U. S. A. and Carada: